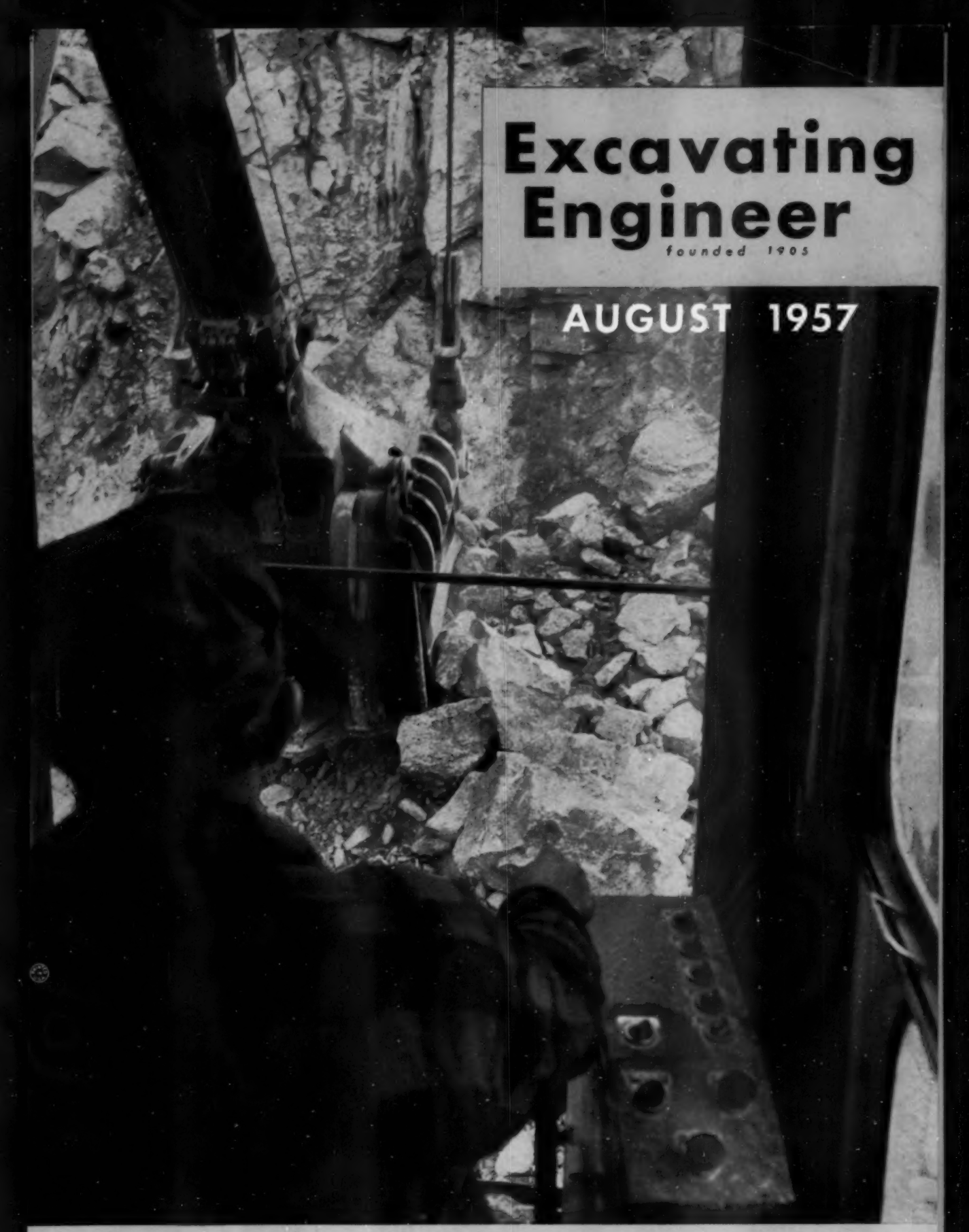
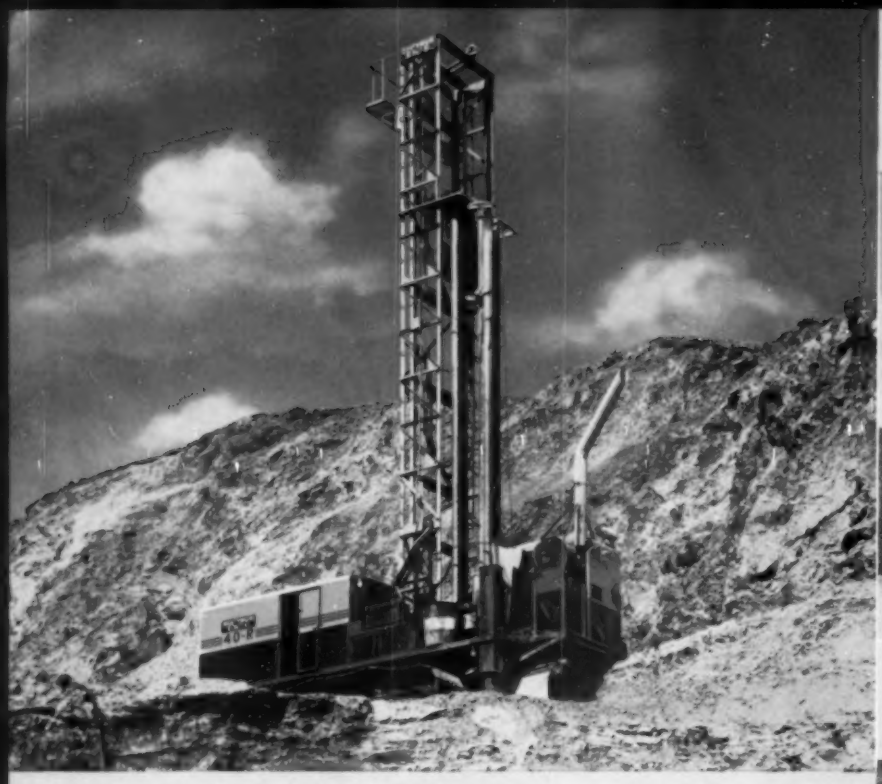


Excavating Engineer

founded 1905

AUGUST 1957

Here's the operator's view from the cab of an electric loading shovel as he fills the 8-yd. dipper with rock blasted from a 48-ft. high quarry face. The quarry is Michigan Limestone Division's dolomite operation at Cedarville, Mich. An article begins on page 21.



This Bucyrus-Erie 40-R is helping to raise production standards at a large open pit copper mine in western U.S.

This Bucyrus-Erie 40-R drills 9-in. holes through leached granite and a pyrite orebody containing copper.

Drilling 9-in. holes at an open pit copper mine, this Bucyrus-Erie 40-R puts down 5 times as much footage as cable tool drills previously used.

Bucyrus-Erie Rotaries Win Strong Approval in the Pits

"Enormously pleased. The 40-R surprised everybody favorably."—Copper mine operator.

"The 50-R drills do as much in one hour as a cable tool drill does in a shift."—Machine operator at a large open pit mine.

"The 40-R solved what seemed an unsolvable drilling problem by producing the necessary speed to stay ahead of the 150-B shovel."—Assistant manager of a large copper mine in western U.S.

These and similar comments are typical of the high regard owners and operators have for Bucyrus-Erie rotary blast hole drills. Since the first Bucyrus-Erie rotary was put into operation over four years ago, both the 40-R and 50-R have shattered old footage records in location after location.

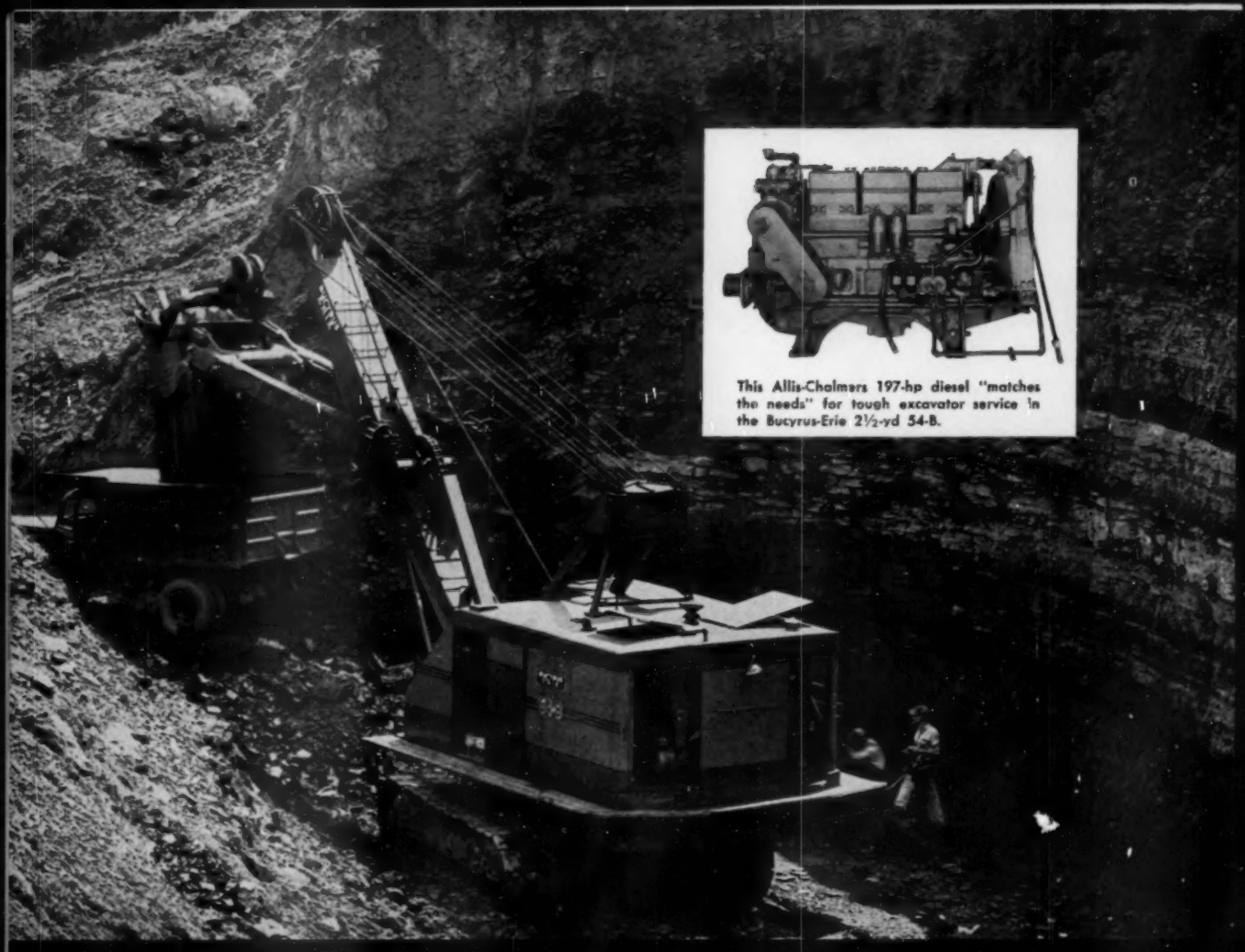
There are good reasons for the popularity of Bucyrus-Erie rotaries. They offer *maximum controlled penetration* through hydraulically powered down pressure on the bit. They also provide *the most efficient drilling speed for a given formation* because of Ward Leonard electric control on rotation of the drill stem. *Hole may be drilled continuously* for the full length of a drill pipe—32 ft. 9 in. on the 50-R, 27 ft. 9 in. on the 40-R.

Bits are cooled by compressed air, and compressed air is used to remove cuttings: fine cuttings are picked up and handled by a Roto-Clone precipitator; heavies pile up adjacent to the drill hole for use as stemming material. *Manual effort is eliminated* for adding or removing drill pipe because of a remote-controlled power-driven drill pipe rack.

Let us tell you more about the speed and economy of Bucyrus-Erie rotary blast hole drills—the 40-R for drilling 6¾- to 9-in. holes, and the 50-R for drilling 9⅞- to 12¼-in. holes. Write today for detailed, illustrated literature. 53857C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN



This Allis-Chalmers 197-hp diesel "matches the needs" for tough excavator service in the Bucyrus-Erie 2½-yd 54-B.

ALLIS-CHALMERS ENGINES MATCH YOUR NEEDS

MATCH YOUR PERFORMANCE STANDARDS — with Allis-Chalmers high-torque, high-usable-horsepower engines that *stay on the job.*

MATCH YOUR POWER REQUIREMENTS — from a wide range of sizes and types, 9 to 516 hp. Specify or install them in *all* your equipment.

MATCH YOUR FUEL SITUATION — There are Allis-Chalmers engines for any fuel you choose — diesel, LP gas, natural gas, or gasoline.

MATCH YOUR SERVICE NEEDS — with close, fast parts and service, wherever you are. Your Allis-Chalmers engine dealer has a full stock of parts, factory-trained servicemen and complete facilities to give you prompt service in his shop or on your job.

See your Allis-Chalmers dealer for full information on engine power and service matched to your needs. Allis-Chalmers, Buda Division, Milwaukee 1, Wisconsin.

BC-8A

ALLIS-CHALMERS *Engineering in Action*

"ONE GREAT PIECE OF EQUIPMENT ...THE NO. 933 TRAXCAVATOR*"

Jim Heron, partner, R. L. Heron & Co.

The job shown here is on a street repaving contract in Los Angeles, California, following the construction of a big storm sewer. R. L. Heron & Co. uses the CAT* No. 933 Traxcavator to handle all its trenching and resurfacing work.

Says Jim Heron: "The tilt and fast bucket action and the oil clutch make this machine the best in its field. We've run a 2,200-foot water trench, three feet wide and nine inches deep, in about six hours with the No. 933. It really serves the purpose of two machines—a digger and a loader. It's one great piece of equipment!"

In any contractor's spread the *new, improved* Caterpillar No. 933 *(Series E)* Traxcavator is a money-making machine. It's fast, maneuverable and easy to move from job to job. It features a new heavy-duty undercarriage with new rugged track roller frame, new solid sprockets, new heavier idlers and new tough track rollers. The one-yard bucket is built for effective digging in tough materials, and the full 40-degree tilt-back at ground level assures full loads without spillage. Fast-acting hydraulic lift controls and high reach speed up truck loading.

Ask your Caterpillar Dealer for a demonstration right on your job. He offers three sizes of Traxcavators—the new No. 933 *Series E* (1 yd.), No. 955 (1½ yd.) and No. 977 (2¼ yd.). And you can count on his reliable service and dependable Caterpillar parts to protect the long work life of the machines he sells. See him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar, Cat and Tractovator are Registered Trademarks of Caterpillar Tractor Co.

WANTED— THE HARD WORK

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Excavating Engineer

founded 1905

South Milwaukee, Wisconsin

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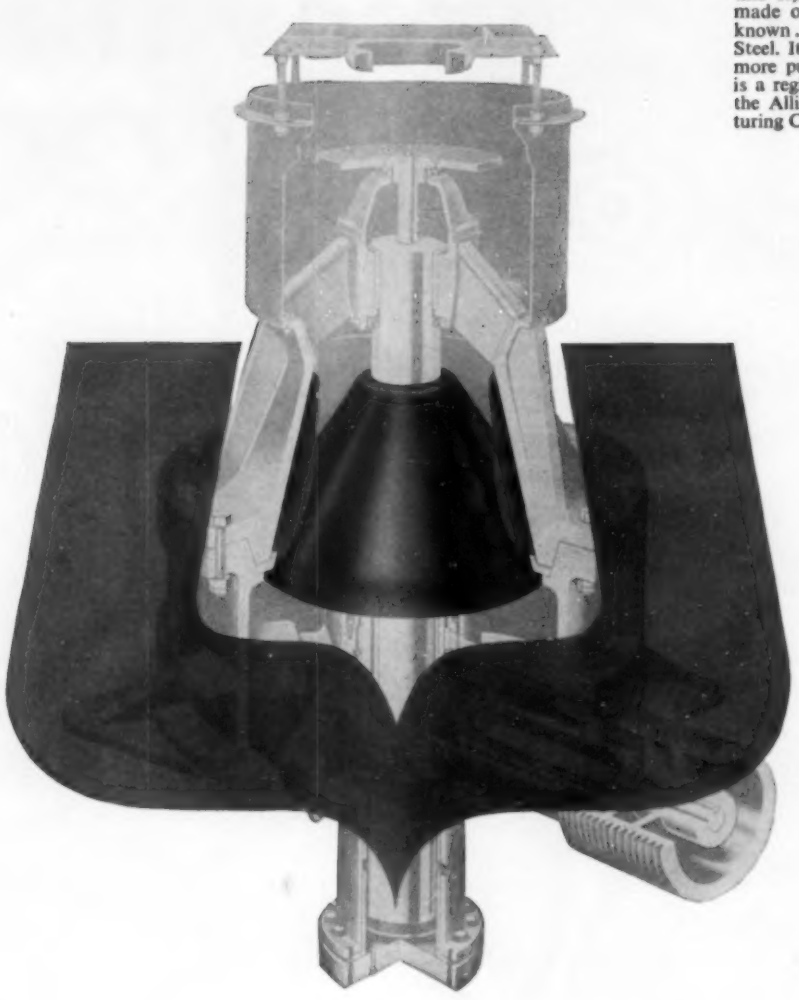


Concave ring and mantle of this *Hydrocone* crusher are made of the toughest steel known . . . Amsco Manganese Steel. It *gives* a little, to take more punishment. *Hydrocone* is a registered trade-mark of the Allis-Chalmers Manufacturing Company.

How a little give adds a lot of life to AMSCO CRUSHER PARTS

Both mantle and concave ring crush a lot more feed because of certain properties of Amsco® Manganese Steel. The metal *gives* a little under crushing forces, absorbs stresses, resists cracking and chipping. Yet these same forces work-harden the surface of Amsco Manganese Steel to as much as 500 Brinell . . . a high hardness, stubborn to wear.

Amsco Manganese Steel Crusher Parts maintain their ductile undersurface and work-hardened surface even when worn thin. That's why Amsco parts endure severe abuse for so many work hours without letup.

To be sure of getting Amsco Manganese Steel, order replacement parts from your crusher manufacturer. Amsco makes manganese steel parts for most manufacturers of crushing, grinding and pulverizing equipment.

Amsco also produces other alloy steels with maximum wear resistance under particular service conditions

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

THE WORKHORSE of the 3/4 yd. FIELD!

Here's a machine you can put into ¾ yd. work and know you are going to get full ¾ yd. output from it. The Northwest Model 25 is built for the workhorse jobs. Machinery Bases are rugged, heat treated alloy steel castings. Machinery side frames are cast integral with the rotating base casting. Realize what this means. It assures a lifetime permanence of shaft alignment. It eliminates weaving that is the direct cause of wear. *There is nothing else like it!*

You can go through the whole machine — Booms! — Sturdier for workhorse digging and lifting. Uniform Pressure Swing Clutches! — cooler running, trouble-free. The Helical Gear Drive! — running in oil, mounted on anti-friction bearings free from the adjustments and stretching that come with chain drives. The "Feather-Touch" Clutch Control! — with the *feel of the load* free from the complications of delicate mechanisms, valves, pumps and tubing. The Cushion Clutch, a wide range of Boom Hoist Equipment to choose from, Easy Convertibility — These and many more advantages give you a piece of equipment with ability that you can't find anywhere else for handling the workhorse jobs and making money.

This is the ¾ yd. machine you should investigate. A Northwest Man will fill in the details.

NORTHWEST ENGINEERING CO.
1506 Field Building, 135 South LaSalle Street
Chicago 3, Illinois

THE GREATEST COMBINATION OF PROVED ADVANTAGES EVER BUILT INTO A SHOVEL, CRANE, DRAGLINE OR PULLSHOVEL

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

2-28-1C3

Here's HYDRO-MAGIC*

* HYDRO-MAGIC *describes the unusual abilities of the Hydrocrane. It is also the title of a new movie that dramatically demonstrates what the Hydrocrane can do. Your Bucyrus-Erie distributor will be glad to show it to you.*

In Either Wide-Open Spaces... Or Tight Places, Hydrocranes Set Steel With Unmatched Precision and Speed

It's HYDRO-MAGIC when a Hydrocrane operator can crack an eggshell with a nine-ton load without damaging the egg. This same hydraulic precision control makes Hydrocranes the best cranes available for steel erecting. More and more steel erectors are recognizing the advantages of this unmatched control — and of the many other important Hydrocrane features like:

Squeeze-in compactness, featuring the shortest tail swing in the business, lets the Hydrocrane work in any spot big enough to hold the truck.

Telescoping boom reaches over, under, between beams, buildings, columns and wires to set the load precisely where you want it.

Fluid soft touch lets operators inch loads into place so carefully that motion is barely perceptible.

Quick-set hydraulic outriggers increase stability, permit fast set-ups and take-downs for travel, make possible 5-ton (H-3) and 10-ton (H-5) crane capacities on standard commercial trucks.

Travel speeds up to 50 mph move distant jobs into your profit range by changing slow travel to fast profit.

Your Bucyrus-Erie Hydrocrane distributor is anxious to show you all these advantages in action on your next steel erecting job. Call him and arrange the date.

176H57C

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

Every minute counts...

when you're paying the bills

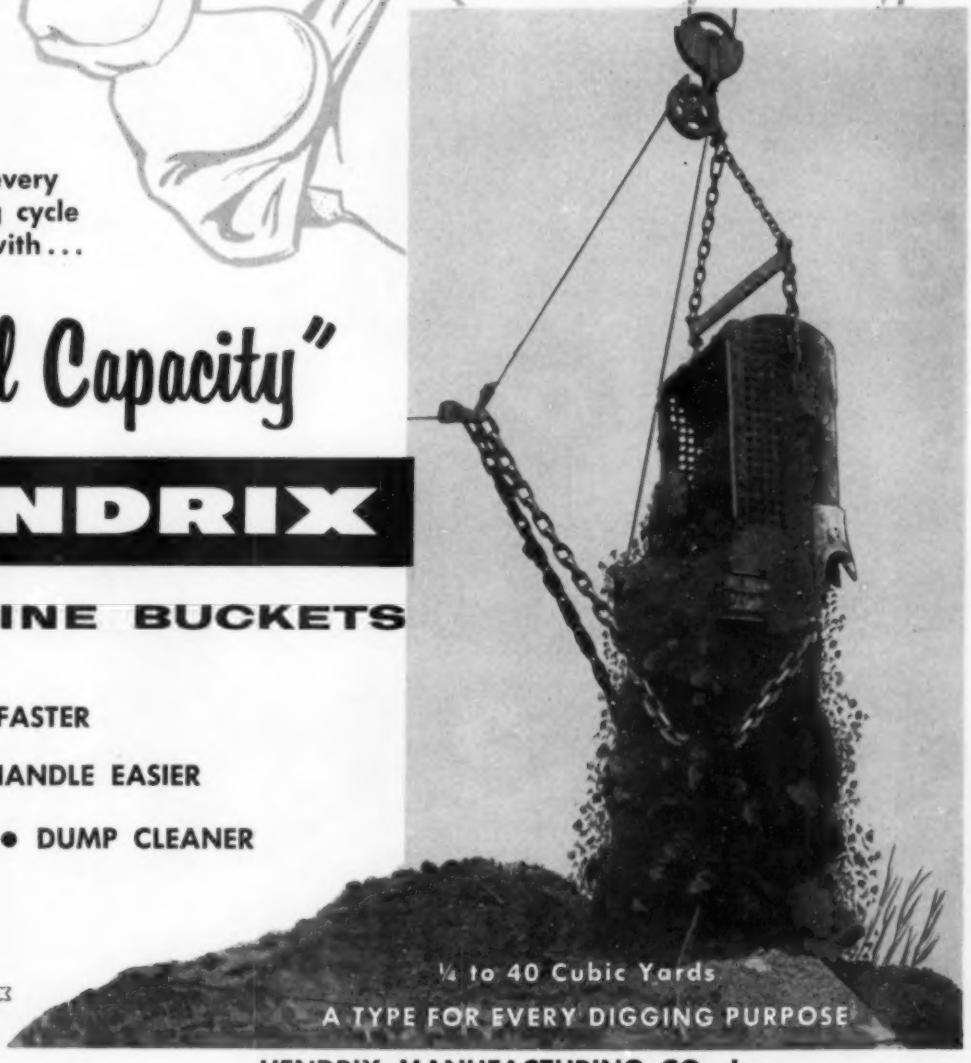
make every digging cycle count with...

"Full Capacity"

HENDRIX

DRAGLINE BUCKETS

- FILL FASTER
- HANDLE EASIER
- DUMP CLEANER



Hendrix Lightweight DRAGLINE BUCKETS

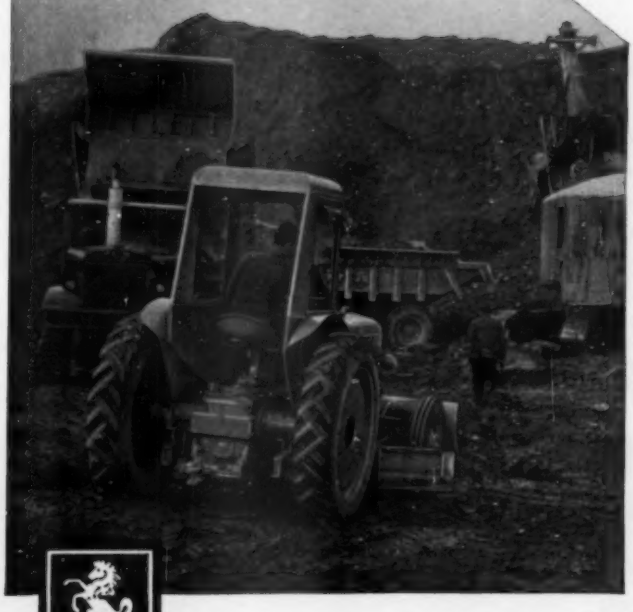
HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

good haul roads . . . . more payloads

AVELING-BARFORD

MAINTENANCE GRADER



Good "housekeeping" is a sure way to more production. Smooth roads speed-up the working cycle of haul units and reduce their down-time and repair costs. The low-priced Aveling-Barford Maintenance Grader has ample capacity to keep haul roads and working areas around plant clean and tidy all day and every day. Costing but 20% of the price of a big dumper, the Maintenance Grader can often save the costs of such a machine. We should be happy to let you have the 'vital statistics' of this trim 'housemaid.' . . .

ask for Folder No. 1755/10

INVICTA

AVELING-BARFORD LTD. • GRANTHAM • ENGLAND

From coast to coast

thrift-minded owners report:

"Climbing the 1,200-foot ramp that rises 100 feet from pit to primary crusher, our '95' Payhauler averages a 22-ton load of shot granite every 8 to 10 minutes," reports Supt. H. C. Burgess, for Superior Stone Co., Woodleaf, North Carolina. "Production of this hauler unit is 1,000 tons per 7 hours." And the "95's" turbocharged diesel burns only 4½ gallons of low-cost fuel per hour on this tough quarry job!

"Grade-beating, rock-speeding Payhauler® gives us the decisive profit margin of difference!"

"The fast reverse of the '95' Payhauler is a big advantage on narrow, one-way haul roads—enabling our two units to keep the big shovel busy," states Howard Durbin, for Durbin Brothers, Eugene, Oregon. "Our other haulers with slow back-up could not do this."

"Down switch-back grades as steep as 30%, the '65' Payhauler takes its loads—then climbs back out at fast speeds," declares Supt. Howard Eaton, for Funderburk Construction Co., Sutherlin, Oregon. "The best of the other haulers of this size just can't keep going on our tough Roberts Mountain haul road, like the '65' can!"

"Two '95' Payhauler trucks (24-ton capacity) replaced three 15-ton competitive haulers, and handle the operation with ease," says Supt. Henderson Hawkins, Stone Mountain Grit Co., Lithonia, Ga. "With unusually fast hoist, good balance, and speedier delivery, the '95's' reduce spotting and dumping time, also save 20% on fuel."

On tough St. Lawrence Seaway—for United Waterways Constructors—11 '95' Payhaulers trucks are sparking a demanding monthly production schedule of 120,000 cu yd of rock, and 100,000 cu yd of common earth. *Next-to-automatic* Payhauler control gives safe, capacity-adding speed over rough terrain!

At 7,600 feet altitude, a fleet of 4 turbocharged diesel-powered "95" Payhauler units help Morrison, Walsh & Perrini highball rock-fill to build Wishon Dam—in Sierra National Forest, California. All 4 operators vote superior riding comfort, torqmatic braking safety, hand-operated dumping brake, as stand-out '95' advantages!

"Engine power matches hauler capacity, to pull a 20-22 ton load from the quarry in second gear, over haul-road grades as steep as 15%," reports J. L. Sutherland, '65' Payhauler operator for Jefferson County Stone Company, Anchorage, Kentucky. "The Payhauler rides good, has excellent visibility, and maneuverability, shifts easy."

Prove an International Payhauler's production-boosting speed! The "95" is turbocharged diesel-powered to highball at 38 mph—the "65" at 36.4 mph! Try the "pick-up truck" spotting ease—using exclusive high reverse and "zip-around" power steering to position the "big-target" body, double-quick. Compare how the double-acting hydraulic hoist, under exclusive hand-brake control, gives 10-to-12-second dumping. Measure the big profit-building margin of difference—see your International Construction Equipment distributor for a Payhauler demonstration!

Satisfaction with two Payhauler trucks on one successful rock-moving contract prompted Clarkson Construction Co., Kansas City, Mo., to add three more "95's" to their fleet—to help handle a new, bigger contract. "Best production I've ever had," says Project Superintendent H. D. Brown.

"Our three '65' Payhauler trucks move up to 2,000 cu yd of shot rock per 10 hours on a 1,200-foot delivery haul," states Warren Greer, for Greer Brothers and Young, London, Kentucky. The contractor is using these trucks to move 165,000 cu yd of shot rock relocating a section of U. S. 27 in Lincoln County, Ky.

INTERNATIONAL®
CONSTRUCTION
EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

These Sand and Gravel Jobs Profited from Bucyrus-Eries... Yours Can Too!

This 1½-yd. 38-B shovel loaded blasted caliche to trucks which supplied a temporary gravel plant.

"We own four 15-B draglines and consider them the very best buy on the market," says the owner of this machine loading gravel for road maintenance in Alabama.

Powerful and sturdily built, this ¾-yd. 22-B offers dependable day-to-day service. It loads blue and rose sand at its owner's pit near Mexico City, Mexico.

This 4-yd. 88-B dragline strips overburden covering gravel deposits. "Our 88-B," says the owner, "is doing a very good job . . . just what we needed for this location."

This 3-yd. 71-B loaded sand and gravel for highway use in New York state. A Bucyrus-Erie 51-B was at work for the same company at a different location.

This 2½-yd. 54-B is one of two Bucyrus-Erie draglines excavating river-floor overburden and pit run gravel to supply a Texas sand and gravel plant.

Put a Bucyrus-Erie on your sand and gravel operations and get the same outstanding performance that is making money for pit owners from coast to coast.

Bucyrus-Erie offers a complete line of convertible machines from ⅜ to 4 cubic yards. Whatever the size, you get dependable on-the-job performance because Bucyrus-Erie designs and builds for quality every step of the way.

Why not join the growing list of owners who have profited from Bucyrus-Erie draglines and shovels? For all the facts on these dependable high-output machines, see your local Bucyrus-Erie distributor soon. 325E57C

A Familiar Sign . . . BUCYRUS ERIE *. . . at Scenes of Progress*

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

NEW SAUERMAN SLACKLINE CABLEWAY INCREASES PRODUCTION OVER 25%

Bucket breaks water with heaping load from a 100 ft. depth...

Wherever deep digging is required and operating spans are long, the new Sauerman Slackline is adding to its margin of superiority over other types of excavators. Production increases of over 25% and in some unusual cases as high as 80% are reported.

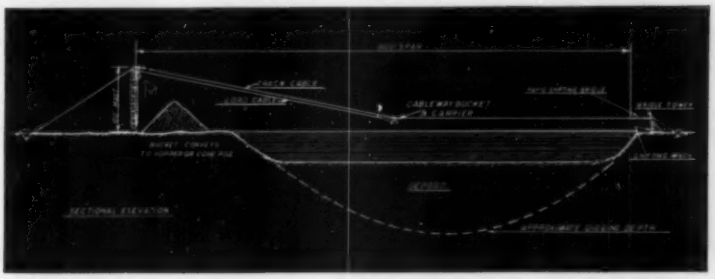
Not only is production increased but operating costs are lowered as cable and hoist wear is reduced and the machine runs with fewer peak loads and shocks—all possible from a cushioned drive using a torque convertor and other refinements.

These benefits are also available to present owners of slackline cableways. Guaranteed Gravel & Sand Co., a Sauerman Slackline user for over 35 years, has increased hoist speeds from 230 to 350 fpm. on the digging cycle and conveying speed to 800 fpm.—a gain of 25%. Guaranteed's 2-cu. yd. bucket is digging 450 ft. away from the surge pile and delivers 150 cu. yds. per hr.

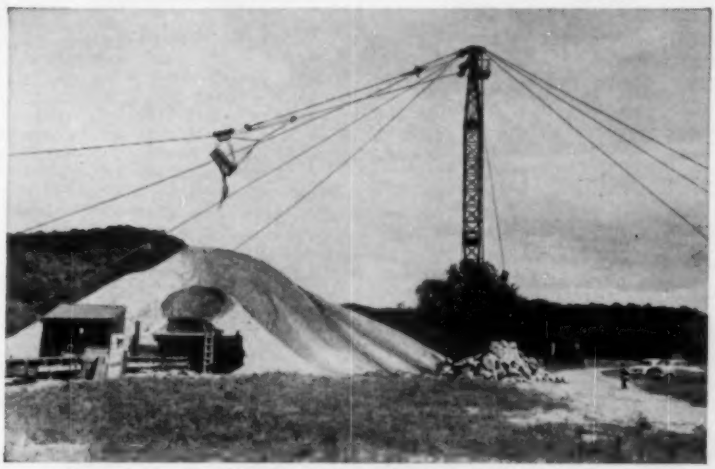
The Sauerman Method lets you work distant material—up to 1,000 ft. away and dig 100 ft. or more below water. Now more than ever the greater tonnage available through fluid drive operation makes a Sauerman Slackline Cableway the low cost way for deep digging.

Get the best machine for your job. Write to Sauerman for expert advice on any materials handling project. For additional information on slackline cableways, ask for Catalog C.

is conveyed and dumped automatically at surge pile.



Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.



Guaranteed Gravel and Sand Co.'s slackline bucket dumps 150 cu. yds. per hr. on surge pile from digging point 450 ft. away.

SAUERMAN BROS. INC. 622 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

Ideas For Earth

TWIN-POWER SETS NEW ON SCORES OF JOBS

Gives production not offered by

New "Euc" has struck capacity of 24 yds.

This Model TS-24 is Euclid's latest development in Twin-Power Scrapers. It has a struck capacity of 24 yds. and 32 yds. heaped at 1:1 slope. Tractor is powered by 300 h.p. engine with 3-speed Torqmatic Drive. The rear axle is driven by a 218 h.p. engine with separate torque converter and semi-automatic transmission. Hydraulic steering provides full 90° turns. Tires are 27.00 x 33 standard with 33.5 x 33 optional. Top speed with full payload is 26 mph. using standard size tires.

Pipeline Padding Costs Reduced More than 50%

ARIZONA — Western Pipe Line, Inc. of Austin, Texas is laying 245 miles of 34" pipe across northern Arizona and a 141 mile connection of 20" pipe to Phoenix. It's a tough job across rugged terrain and requires equipment that can take steep grades and rough going.

The pipe must be protected with a 6" blanket of selected material—about one yard of dirt per lineal yard of pipe. Two "Twin" Scrapers have been working on the padding operations hauling material from 1200 ft. to several miles over grades as much as 39%. The contractor reports that the production and work-ability of these scrapers have cut padding costs in half as compared with former methods used.

Rush Job Finished 4 Months Ahead of Schedule

SOUTH DAKOTA—J. H. Beckman Construction Co. of Sioux Falls was awarded a grading contract for 6.8 miles of U. S. Route 16 that involved 360,500 yds. and had to be completed in 6 months. Four Euclid Twin-Power Scrapers, supplemented by 3 other scrapers, some crawler equipment and 3 motor graders, were put on the job and worked 11 hour shifts six days a week.

Because of their Twin-Power and all-wheel drive, the "Eucs" worked independently without assistance from pusher tractors. On one cut they self-loaded 20 bank yards of gumbo and shale in about 45 seconds — completed the 870 ft. haul cycle over cut and fill in an average of 2.83 minutes. Hourly production was 353 yards. Self-loading sand and top soil in another cut the Euclids averaged 21.6 yards in less than a minute. The complete 600 ft. cycle took about 2½ minutes and hourly production averaged 415 bank yards.

With these versatile, fast dirt-movers on the job, grading was completed far ahead of the rush schedule.

Versatility Pays Off at Noxon Rapids

MONTANA — Two Twin-Power Euclid Scrapers are being used by Morrison-Knudsen Co., Inc. at Noxon Rapids Hydro-electric Project on the Clark Fork River in Western Montana. They are building roads, helping with excavation at the dam site and supplementing a large fleet of other Euclid hauling equipment.

Working in heavy wet clay or in sand and gravel the "Twins" pick up loads of 18 yds. or more without help from pusher tractors. With big single tires and all-wheel drive, they work in soft and rutted areas and have plenty of power to move heaped loads over long hauls at fast travel speed.

Owner says "Euc" Twin-Power Scrapers have revolutionized dirt moving in the West

SOUTH DAKOTA — Harris Construction Co. moved 1,000,000 yds. of shale for a railroad relocation job at Mowbridge with only 6 scrapers one motor grader and one roller. That's probably as small a spread of equipment as you'll ever find on a project of this size yet production averaged 13,000 yds. per 10-hour shift. Cycle time on a 1600 ft. haul was about 4 minutes . . . each "Twin" averaging 225 yds. per hour. Owner Ken Harris has found the Twin-Power Scraper the most efficient dirt mover he's ever used and this railroad job wasn't the first time he had parlayed Twin-Power into low cost high production.

In April of 1956, Harris set a new earthmoving record on Montana highway work by moving 90,000 yds. on hauls up to 4000 ft. during six 10-hour shifts. At the same time he was working on the road job, Harris had a 1,200,000 yd. subcontract at Glasgow Air Base, 26 miles away. He moved his "one man earthmoving crews" from one job to another according to weather conditions and work requirements. The "Eucs" were used to the best advantage all the time because there was only an hour's travel time involved and they worked independent of pusher tractors normally needed by scrapers for efficient operation.

3 Million Yard Waste Dump Moved by "Twins"

ONTARIO, CANADA — Moving an old waste dump from a drained lake bed presented a tough problem for Steep Rock Iron Mines, Ltd. The material, consisting of wet silt, low grade ore, stone and boulders, was heavy—about 3200 lbs. per yard. Hauling conditions were difficult because of the soft, spongy footing so it seemed that the job would have to be truck-shovel operation. In spite of these adverse conditions, a Twin-Power Scraper was demonstrated on a haul of 5300 ft. round trip with grades up to 10%. Performance was so outstanding that four machines were purchased and are now effecting major savings on an almost "impossible" scraper job.

Twins Tackle Tough Road Job

VIRGINIA — Contractor Robert T. Main used a Twin Scraper and TC-12 Crawler in a highway cut that had stopped other scrapers because of the extremely soft footing. This combination of Euclid "Twins" had plenty of power, traction and flotation to get the job done efficiently—it replaced a dragline that was brought in when it looked like the job couldn't be done by scrapers.

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Ten "Twins" Move Nearly 40,000 Yds. Per Day

NEBRASKA — Western Contracting Corp. of Sioux City, Iowa, used 10 "Twin" Scrapers and 5 Euclid TC-12 Crawlers to move 3 million yards on a plant site grading project with a 5 month completion limit. Equipped with 6 yard sideboards and push loaded by the big "Twin" Crawlers to get maximum production, the scraper fleet worked 20 hours a day and moved close to 40,000 yds. daily on hauls of 1500 feet.

This leading contractor's belief that Euclid Twin-Power is tops for low cost earthmoving is backed by lots of previous experience on high production jobs. At Ft. Randall Dam they used a fleet of 30 Model LLD 50-ton Rear-Dumps powered by two 300 h.p. engines. For a 7 million yd. Indiana Turnpike contract Western purchased 15 Twin Scrapers and 5 Model TC-12 Euclid Scrapers. After finishing this big job, part of the Twin fleet was assigned to Oahe Dam while others tackled a highway project in Michigan. This well-known contractor is so "sold" on Euclid Twin-Power Scrapers and Crawlers that estimates and bids are made on the basis of the low cost production that "Twins" provide.

Couldn't Believe His Own Stop-Watch

IOWA — When a contractor-visitor to Wilbur Nielsen's road grading job made a time check on 3 Twin-Power Scrapers he sent to town for another stop-watch because he couldn't believe the time registered on the one he'd used!

The "Twins", equipped with 6 yd. sideboards and push loaded by a torque converter crawler tractor, got loads of better than 24 yds. in an average of 50 seconds. In spite of the mile and a half long haul, the three scrapers averaged 336 yds. per hour. Working 10½ hour shifts six days a week, with an availability record of 95%, Nielsen's "Eucs" completed the grading well ahead of schedule.

"TWINS" are making headline news!

Twin-Powered Euclid Equipment is out-performing all other equipment by a wide margin — the profit margin — on all kinds of earth-moving. With "Twins" in your fleet you'll have a bidding advantage that can pay off in more jobs and more profit. Get the facts from your Euclid dealer and you'll know why owners everywhere have proved Euclids are your best investment.

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Granite-heaped hauling units flow steadily from beneath the dipper of this 6-yd. Bucyrus-Erie 150-B shovel — one of two such units being used by Morrison-Walsh-Perini in construction of the Wishon Dam for the Pacific Gas and Electric Company.

This $12-million rock-filled dam will be located on the north fork of the Kings River, 88 miles east of Fresno, California. It will require excavation of 3½ million cubic yards of granite and impervious material.

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The field-proved quality built into Bucyrus-Erie machines makes them the choice of the men who handle the big jobs like this Wishon Dam project. Write for full information on the Bucyrus-Erie 110-B, 150-B or 190-B heavy-duty excavators. 131L57C

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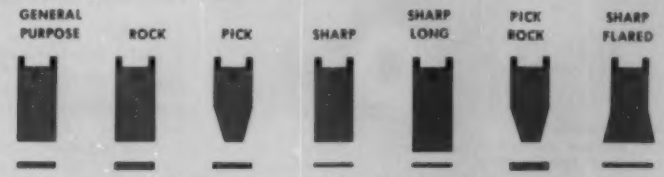

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An 8-yd. shovel loads limestone from a 48-ft. high bank. Seven 22-ton end-dump trucks work under three loaders in the quarry.

Dolomite Quarry Is Efficiency Model

Michigan Limestone Division's Cedarville quarry is an important new source of high magnesia fluxing stone and refractories. Output capacity of the operation is 3 million tons per year.

WITH an output capacity of 3 million tons of dolomite limestone per year, the Cedarville (Mich.) operation of Michigan Limestone Div., United States Steel Corp., is one of the Great Lakes region's largest quarries.

It is located on the north shore of Lake Huron about half-way between the Straits of Mackinac and Detour Passage, the channel for shipping between Lake Superior and the lower lakes. Sault Ste. Marie with its historic Soo Locks lies 35 miles directly north.

The operation consists of a processing plant and a loading dock located on

Tons of limestone tumble into the bowl of a 60-in. gyratory primary crusher in the pit-bottom crushing house. Crane hook above the crusher dislodges stuck pieces.

Closeup view shows pestle breaking stone in the bowl of the big gyratory crusher.

McKay Bay about five miles east of the resort town of Cedarville, and a quarry farther inland. The bayside facility is named Port Dolomite, after the formation that is the source of its production. Port and quarry are connected by a five-mile single-track railroad.

The quarry has been active since spring of 1955 when the [illegible] shipment of stone was made. That year's initial quarry production was 2,500,000 tons. In 1956, the total was 2,300,000 tons and would have been higher except for the general tieup of Great Lakes bulk shipping last summer.

Ideal Quarry Site

Michigan Limestone had two main reasons in selecting the plant site near Cedarville. First of all, the harbor on McKay Bay is sheltered from winds and waves by off-shore islands belonging to the upper peninsula's Les Cheneaux (The Snows) group; there is a natural channel with a minimum depth of 26 feet leading from the pier into deep water of the bay. Second, the inland quarry produces a special type of limestone used in metallurgical and chemical applications.

The Cedarville stone dumped into the holds of carriers at Port Dolomite is a superior grade of dolomite limestone with practically no impurities. Chemical content of the deposits runs almost 100% magnesium and calcium carbonates, with just a small amount (less than one-half of 1%) of other compounds. Silica is present in only minute quantities and there are only slight traces of sulphur and phosphorus.

Steel mills today use large amounts of this high-magnesia stone in open hearth furnaces or as flux in blast furnaces. If a steel mill wants material with a lower magnesia content, Michigan Limestone combines the Port Dolomite product with a higher calcium limestone from its Calcite quarry near Rogers City in lower Michigan. By mixing the proper proportion of each type of limestone, the company can give its customers the exact magnesia percentage specified. The intermixing is done at the Rogers City plant or it can be done by customers who maintain separate inventories of each grade of stone.

The designed capacity of the processing plant at Port Dolomite is 1,800 tons per hour. Stone is turned out in eight different sizes as follows:

Flux—5x3	#4 —1x⅝
#1 —3x2	#5 —⅝x⅜
#2 —2x1½	#6 —⅜x8 mesh
#3 —1½x1	Meal—minus 8 mesh

The three largest sized products are used in blast furnaces to remove impurities from the smelted iron. The 5 x 3-in. size is a standard flux. Grades #1 and 2 are known as special flux.

The next three intermediate sizings—grades #3, 4 and 5—are screened primarily as construction aggregates for such uses as roadbuilding and railroad ballasting.

Rice size material of grade #6 is used principally in building up the banks and bottoms of open hearth furnaces. It is also commonly used as an aggregate for concrete mix.

The smallest sizing, which is finer than ⅛ of an inch, is used in fine grinding and for miscellaneous construction purposes.

The geological formation from which the stone is quarried is Engadine dolomite, which occurs in four layers. The

A second 8-yd. electric shovel clears broken material away from the base of a bank whose top has sheared off.

(Above) The quarry uses an unusual rig for secondary drilling. (Below) Riding the boom via a trolley arrangement, operator adjusts the drill mast to the proper angle.

E-3 and E-4 stratums are largely weathered away in the quarry area. The E-2 stratum that is being quarried first is 70 to 80 feet thick. The lower E-1 stratum is 32 to 50 feet thick.

The area in which the quarry is located was slashed out of a second growth timberland in 1953. The pit, at the present time, is still rather confined, being 1,700 feet wide and 1,200 feet long. Covering the stone are pockets of glacial drift, 15 feet deep in places, and located between pinnacles of rock and in crevices difficult to reach. Stripping is largely done in winter when quarrying is at a standstill.

Two 8-yd. Shovels

The E-2 formation is being worked to provide an average 48-ft. rock bank for three electric loading shovels. There are two Bucyrus-Erie 190-B's with 8-yd. dippers and one Marion 4161 with 6-yd. dipper. All dippers have Esco 12M manganese tooth points for resistance to abrasion. In good banks the 8-yd. shovels each load an average of 600 net tons of rock per hour; the 6-yd. shovel gets out about 400 net tons.

Working under the electric loaders are seven 22-ton end-dump 27FD Euclids whose bodies are built up with sideboards to increase capacity. These relatively few trucks are sufficient to handle the large volume of rock production because the haul to the primary crusher is very short. A pair of trucks assigned to a shovel make the trip up and back in

Port Dolomite is located on north shore of Lake Huron 30 miles from Straits of Mackinac. First shipment of stone from quarry was made in the spring of 1955.

time to keep the shovel operator constantly busy. "Drive-through" truck loading procedure helps to cut time off the hauling cycle. The floor around the shovels is cleaned off periodically to provide the proper approach for the Eucs. The truck fleet also includes a 20-ton Mack which is used for yard work and for hauling overburden.

Bulldozing equipment consists of four Caterpillar D8's which are shared by the quarry and processing plant, and a rubber-tired LeTourneau-Westinghouse Tournadozer which is permanently assigned to cleanup work around the shovels.

A 20-ton truck crane is available as a general utility crane at the quarry and as a yard crane at the plant.

The exceptional hardness and toughness of the dolomite limestone which make it desirable for use as aggregates also make it a difficult material to drill. Primary blast hole drilling is performed by a pair of Joy B58H Heavyweight Champion electric rotary drills which bore 6¼ or 7⅞-in. diameter holes, depending upon the explosive used. Average hole depth is 54 feet and average drilling speed is 15 to 18 feet per hour.

A special shooting problem is presented by the manner in which the limestone formation is laid down. The formation has an inclination that dips from north to south. When the blast holes are drilled to take off a cut about 18 feet wide, large blocks of rock tend to shear off from the area behind the row of blast holes and ride down with the blast upon the broken burden. These blocks then require substantial secondary drilling and blasting.

Unusual Drill

To handle the extensive secondary drilling required, the quarry utilizes a special purpose rig consisting of an air-operated drill which travels into working position on a long boom mounted on a carriage.

This boom is equipped with a trolley on which a plug drill and a chair platform for the operator are carried. Using air controls from his chair, the drill operator can ride up or down into any desired position above the slab of stone on which he will work. The boom itself swings right or left horizontally and can be raised or lowered vertically.

The rig, called a Travel Drill, has greatly speeded up the secondary drilling process and improved the blasting effect by allowing holes to be put down in hard-to-reach places. The operator can easily drill holes at many angles difficult or impossible to maintain with a hand-held jackhammer or wagon drill. The machine is powered by a 350-cfm compressor.

A 1½-in. carbide steel drill rod is used in the drill. Blast holes produced are loaded with 1-in. sticks of 40% dynamite. Before these small blasts are set off, shovel and truck equipment is moved back and danger warnings sounded because small fragments are thrown considerable distances.

(Left) A rotary drill works close to edge of bank. (Right) a 6½-yd. shovel brings up a load from a bank built up by a dozer.

A train of cars is switched into a tunnel under quarry surge pile for loading. Stocking boom feeds product from primary crusher.

From the loading faces to the primary crusher house, there is a distance of not more than 1,200 feet. The location of the station on the pit floor, rather than on natural ground level, is an important factor in getting maximum use out of hauling equipment. The big 60-in. gyratory primary crusher is capable of eating up rock in a hurry to keep the trucks moving. Bowl and pestle of the unit are lined with hard, tough manganese steel.

Crusher concaves are manganese and the mantle is chromium-molybdenum. With a 7-in. open side setting, the crusher can handle 1,650 net tons of dolomite per hour.

Crushed material from the gyratory drops down into a hopper which feeds a 54-in. continuous rubber belt conveyor. The division's engineers drilled and blasted an inclined tunnel 130 feet long through rock from the hopper base up to ground level to permit the stone to be lifted by belt from the pit.

At ground level, the conveyor belt is carried by a large stocking boom. From the end of the boom, primary crushed stone drops down to a large surge pile that is built over a reinforced concrete loading station. Railroad dump cars are switched into the station by locomotives and loaded by means of overhead hydraulically-operated gates which slowly release the stone.

There are about 8,000 net tons of recoverable stone in the surge pile. The pile helps to balance quarry production with that of the plant, depending on the ability of the railroad to deliver it to Port Dolomite.

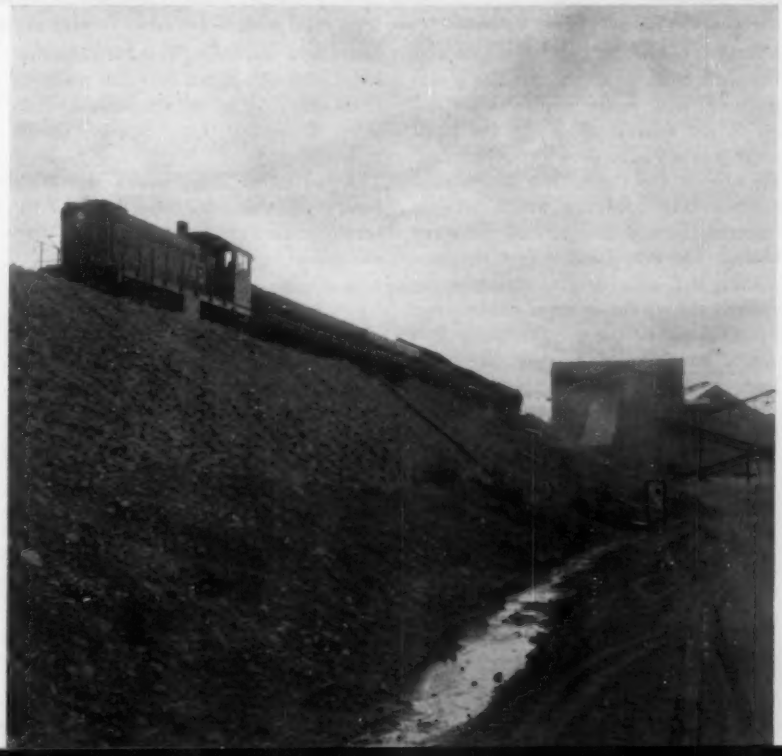
Five-Mile Run

The air-operated side-dump cars vary in capacity from 35 yards or 50 tons to 60 yards or 85 tons. They are made up into trains of over 1,000 tons capacity. Two 1,000-hp diesel-electric locomotives are in service to shuttle the trains back and forth over the five-mile run to Port Dolomite.

Elevation of the loading pocket at the quarry is about 100 feet higher than track facilities at the port, and therefore, there is a gradual down grade on the loaded run, although a long stretch of the track is built on an embankment over swampy land which is the low point of the railroad grade. Running parallel to the track are powerlines from the quarry, and a service road for trucks and employees' cars.

At Port Dolomite, another surge pile

Each train from the quarry brings 1,000 tons of rock to the Port Dolomite surge pile where side-dump cars spill their loads into a chute that feeds a 36-in. conveyor belt.



Aerial shows layout of Port Dolomite. Stone from eight piles is delivered through reclaiming tunnels by conveyor to dock at left.

is located below the railroad trestle near the plant from which the side-dump cars discharge their loads. Similar to the set-up of the quarry surge pile, the plant surge pile is placed over a concrete tunnel. Inside the tunnel is a 54-in. continuous belt conveyor which receives material through air-operated gates and chutes. The belt passes over a weightometer, and this device automatically records the weight of stone passing over it. Essentially, the weightometer is a device which suspends two idlers. The load on these idlers is meshed with the speed of the belt and thereby totals the load passing over the weightometer.

The conveyor goes on to carry the material to a 6 x 14-ft. single deck scalping screen which removes all stone above five inches and diverts it to the secondary crusher. A 24 x 60-in. gyratory in a closed circuit system, reduces the oversize and diverts it to the 48-in. screen-house feed conveyor. There it joins material already passed by the scalping units and rides up on the inclined conveyor about 280 feet to the top of the screen house.

A series of double-deck vibrating screens positioned on upper levels of the screen house size the material into various grades.

Flexible Plant

The plant design offers complete flexibilty for making any product in demand. Screen cloths can be readily replaced to vary the size of the material which they will pass. Two cone-type tertiary crushers are available as auxiliary facilities for recrushing any size of screenings from 3-in. down to ⅜-in.

The largest size of stone produced in the screen house is delivered by conveyor to a stocking boom which drops it on a storage pile on the side of the screen house facing water; the smallest size made is discharged by a similar boom on the opposite side of the screen house to a stockpile facing inland (see aerial view on this page).

The six intermediate sizes travel by continuous belt to a 360-ft. long triple-deck stocking bridge attached to the rear of the screen house. At points along the bridge, the six streams of stone are diverted right and left on lateral stocking booms to two rows of storage piles on each side of the bridge. The booms are 57 feet long and have 24 to 36-in. wide belts.

There is considerable flexibility in the stockpiling setup. The lateral stocking booms are track-mounted on the bridge and can be shifted horizontally to give a particular spacing of piles. A dozer is assigned to shape the piles, some of which reach 70 feet in height.

Shuttle-type ship loader mounted on rails along the length of the 570-ft. dock loads the graded and weighed stone product into ship holds at the rate of 2,800 tph.

Extending the full length of the two rows of storage piles are reinforced concrete reclaiming tunnels containing 54-in. conveyors. The recovery belts in these tunnels draw down material from stockpile and deliver it to the main conveyor which loads the dock conveyor. Along the way, a weightometer records the weight of stone being taken out of storage.

Wash water for operation of the screening plant is pumped out of McKay Bay by two 75-hp centrifugal pumps located on the end of the loading pier. The high-volume, low pressure pumping system runs at 3,000 gpm, although top capacity is 4,500 gpm each, and discharges through a 24-in. line into a reservoir at the screening plant. Here the water is picked up by a 250-hp two-stage centrifugal pump and delivered throughout the 100-ft. high screening plant.

Superfine Stone

Used water is not simply dumped back into the bay, but is sent down to a reservoir at the base of the screen house and then pumped into a large open settling basin. Small particles of stone suspended in the water settle out to the bottom of the basin and are periodically scooped out for sale as superfine stone.

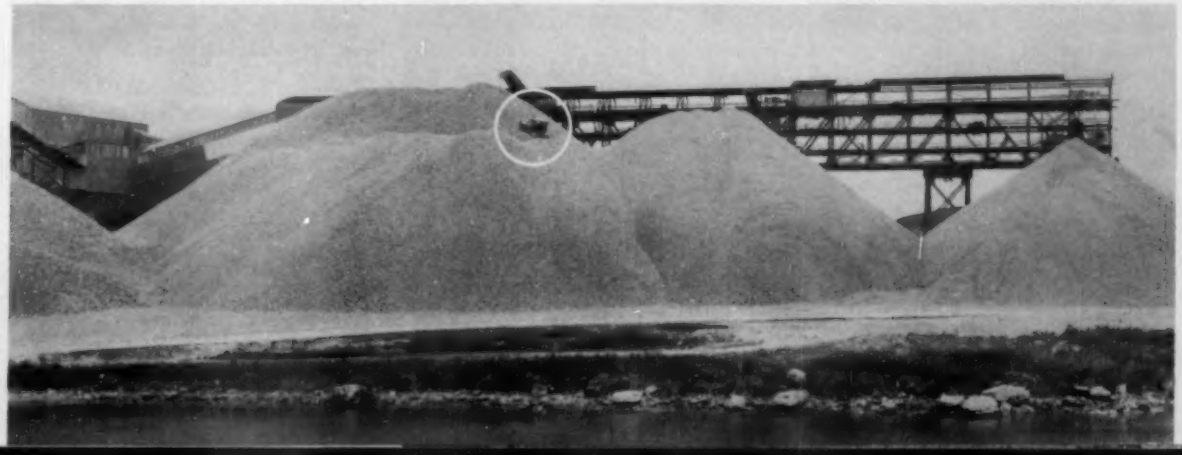
Electric power is supplied to the plant and quarry by Edison Sault Electric Co., Sault Ste. Marie. A 69,000-volt transmission line orgininates near Rudyard, Mich., about 20 miles northwest of the quarry. This line is tapped at the quarry substation, reduced to 4,160 volts and distributed, or further reduced as required. The 69,000-volt line continues south to the plant substation where it is again tapped, reduced to 2,300 volts and distributed.

Port Dolomite's dock is 619 feet long and 117 feet wide. The dock is a rectangular cell built by Michigan Limestone Div. Division engineers drove 72-ft. lengths of steel sheet piling into the bottom of the bay and filled in the enclosure with rock to form the pier.

Vessels from 6,000 to 20,000 tons call at the port. No tug service is required for them because the bay is so well sheltered. Loading time for the vessels takes 2½ to 6 hours. Boats of United States

Continued on page 58

Size of stockpiles is illustrated by a large dozer grading shoulders. Stocking bridge provides flexibility in arrangement of piles.



This map of the St. Lawrence from Montreal to Lake Ontario shows region covered by Milwaukeeans in Seaway and Power tour.

Tour Reveals Progress of Seaway

MILWAUKEE, a metropolis of a million persons on Lake Michigan, believes that completion of the St. Lawrence Seaway in 1959 will further enhance its economy.

Wisconsin's largest city is well known as a compatible basin for beer and the baseball Braves. What might not be as well known is that Milwaukee is one of the nation's leading industrial centers and has one of the best equipped ports on the Great Lakes.

Milwaukee at times stood virtually alone in the long battle to encourage congressional approval of Seaway legislation. Finally, in 1954, President Eisenhower signed the Wiley-Dondero bill — Wisconsin's Senator Alexander Wiley was one of the co-authors—to allow United States participation with Canada in construction of the St. Lawrence Seaway.

Excavating Engineer representative accompanies a group of Milwaukee businessmen on a flying-bus-foot tour of the St. Lawrence Seaway and Power projects and comes away awed.

Though the present system of locks through the St. Lawrence limits navigation to ships with a maximum draft of 14 feet, Milwaukee each year continues to become a port of call for an increasing number of foreign flag vessels. When 27-ft. navigation becomes available with completion of the Seaway, Milwaukee will be ready to handle the increased commerce with modern port facilities. The city has spent or plans to spend nearly $20 million in improving and expanding its port.

One wet morning in mid-June, nearly 50 Milwaukee businessmen boarded a chartered DC-4 airliner to make a three-day tour of the St. Lawrence Seaway project and the related St. Lawrence Power project. The tour, to better acquaint businessmen with the size and scope of the undertaking, was sponsored by the Milwaukee Association of Commerce. A representative of *Excavating Engineer,* which is published in South Milwaukee, was aboard. He was making his second trip to the Seaway and Power projects; still, he came away awed at the progress made since the previous visit less than two years before.

Woodie Herman, the captain who piloted the DC-4 without a clarinet—he's not related to the band leader—traveled along Milwaukee's shoreline to start the five-hour flight to Montreal, Que. A good view of Milwaukee's harbor was there for the looking.

Between sips of champagne and bites of the ensuing filet mignon, the men further acquainted themselves with what they were about to view in the next three days by reading literature and scanning maps provided them in kits by the Association of Commerce.

Some of the projects' vital statistics amazed the men. These included the overall cost of $1.1 billion and the amount of excavating and dredging, something approaching 225 million cubic yards. Some of the figure filberts on the tour calculated that this rock and earth would be enough to fill a city lot to a height of 200 miles.

Here's what those $1.1 billion will provide, thanks to the effort of a labor force that now totals nearly 16,000 and an estimated 3,500 pieces of earthmoving equipment:

1. Seven new locks—five being built by Canada and two by the United States —will enable the Seaway to bypass a series of rapids and obstacles that exists for more than 100 miles in the St. Law-

(Left) Eisenhower Lock on the American side is rising rapidly. (Right) Armed with cameras, tour members inspect a job site.

rence River between Montreal and Iroquois, Ont. Excavation for these locks, canals and channels will total 51 million cubic yards; dredging will take another 18 million yards. Other work will include construction of 10 new bridges and remedial work on others. Canada's Seaway cost (St. Lawrence Seaway Authority) will be about $285 million; the United States (St. Lawrence Seaway Development Corp.) will spend about $140 million.

Power Project Big

2. The St. Lawrence Power project, through which construction of the Seaway itself was made economically feasible, is a joint undertaking of the Hydro-Electric Power Commission of Ontario and the Power Authority of the State of New York. Province and state each will spend approximately $300 million, raised through the sale of revenue bonds. Principal project structures include the 3,300-ft. long St. Lawrence Power Dam (formerly the Barnhart Island Power House), the Long Sault Dam and the Massena Intake, all located in the International Rapids area near Cornwall, Ont., and Massena, N. Y., and the Iroquois Control Dam at Iroquois. By producing 1,880,000 KW, the St. Lawrence Power Dam will rank second in world production. Only Grand Coulee Dam's 1,947,000 KW will outrank it.

New York is constructing all of the Long Sault Dam, Iroquois Dam and the Massena Intake. Each entity is building half of the power dam. Ontario, however, has considerable highway and railroad relocation work, in addition to the relocation and rehabilitation of several towns. Some 63 million yards will be excavated for channel improvements by both Ontario and New York.

The power development begins 76 miles downstream from Lake Ontario and continues for 40 miles downstream.

Among the officials who greeted the Milwaukeeans were Lewis G. Castle (left), administrator of the U. S. Seaway, and M. W. Oettershagen, deputy administrator.

View of Niagara Falls

Capt. Herman made three passes over Niagara Falls, the spectacular natural barrier between lakes Erie and Ontario. In minutes, the DC-4 was over the Welland Canal, which enables ships to bypass Niagara Falls. Locks on the 27-mile long Welland serve as models for the seven new Seaway installations. The Welland already has a depth of 25 feet; the channel is being enlarged to the required 27-ft. depth by both dry (in the non-navigation seasons) and wet excavations.

In another half hour, the airplane headed over the St. Lawrence River and into the heart of the Seaway and Power works. The beautiful Thousand Islands were below. Freighters and lakers busily cut a pattern through the channel. Soon, big draglines, smaller excavating equipment and ever-present dredges were sighted reducing the level of islands and improving channels. Suddenly, the first big Seaway and Power

Tour members were particularly impressed with construction of the St. Lawrence Power Dam, which will be 3,300 feet long. Here is a view of Canadian side of the dam.

Water rushes through the completed half of the Long Sault Spillway Dam, the control structure for the power pool, as seen from the tour airplane (darn propeller!).

installations appeared at Iroquois—the Iroquois lock and control dam. The St. Lawrence River already was bubbling through the completed half of the dam, even as work on the second half progressed behind cofferdams. Nearly abutting the dam was the lock itself.

Minutes later the plane was over the Massena-Cornwall area, site of the most concentrated work on the projects. The first of the two American locks—the Eisenhower—was spotted, followed by the Long Sault Dam, the Grasse River Lock and the St. Lawrence Power Dam. This was, necessarily, a teaser for the actual ground inspection to come the following day; yet, the air survey enabled the men to better visualize the relation of the individual structures and diggings they saw below to the projects as a whole.

See Beauharnois Canal

Lake St. Francis, a natural widening of the St. Lawrence, passed out of view and the 16-mile Beauharnois Power Canal appeared. Ships will navigate through this canal, aided by two locks. The plane dipped over another widening, Lake St. Louis, and landed at Dorval Airport. Not seen from the air were the St. Lambert and Cote Ste. Catherine sections of the Seaway. They would be viewed later by bus and foot-power.

First stop for the businessmen-tourists was at Ville LaSalle, near Montreal, where they saw the St. Lawrence Seaway Authority's hydraulic laboratory. Two large models, built at a scale of $\frac{1}{200}$ of the actual river, show critical sections of the river between Lake St. Louis and the Montreal harbor.

Then the buses deployed to the actual construction sites. Here, briefly, is what the men saw, as they traveled from Montreal to the Thousand Islands:

The St. Lawrence Seaway begins at Montreal harbor. Below the harbor to the Atlantic Ocean, 1,000 miles away, 35-ft. navigation is available. The first barrier to navigation on the St. Lawrence is the Lachine Rapids opposite Montreal. The rapids presently are circumvented by the Lachine Canal on the 14-ft. navigation system.

The canal and two locks are being constructed in the dry behind a high rock and earth dike which extends as much as 4,000 feet from the south bank of the river. Excavating and concreting equipment are kept busy night and day to make sure that the Canadian locks and channel are ready for the 1959 navigation season.

Both locks in the Lachine section—the St. Lambert and the Cote Ste. Catherine, nine miles upstream—are rapidly taking shape. The St. Lambert lock will have a lift of 15 feet; Cote Ste. Catherine will lift ships 30 feet to the overland channel which will lead into Lake St. Louis. All of the 450,000 yards of concrete for the St. Lambert lock probably will be poured by fall; most of Cote Ste. Catherine's 350,000 yards of concrete will have been placed before winter. Long-boomed cranes and conveyors are doing the concrete pouring at St. Lambert; three tall, slim gantry cranes handle the job at Cote Ste. Catherine. All locks on the Seaway will have approximately the same dimensions: usable length, 768 feet; width, 80 feet; depth over sills, 30 feet. Channels will be excavated to a depth of 27 feet. Minimum channel widths are: 200 feet when flanked by two embankments, 300 feet when flanked by one embankment and 450 feet in open reaches.

Bridge Work Interesting

An interesting aspect of the Seaway project at Montreal is modifications necessary to bridges crossing over the channel. Most spectacular work is at the Jacques Cartier bridge, where the Seaway will intersect between two piers providing a present clearance of 40 feet. Another 80 feet of clearance is necessary. Some 30 of this will be gained by replacement of the existing deck truss span by a through-truss span, which will be erected on falsework beside the present plant. The other 50 feet will be obtained by jacking the bridge structure and extending the supporting piers vertically upwards. This will be done in stages and without interference to traffic. The bridge will be closed a total of only about six hours, to allow replacement of the span.

Some of the most interesting and challenging Seaway work is at Beauharnois, where two locks are being shoved through hard and abrasive sandstone. Tour members were amazed to hear that shovel teeth lasted as little as eight hours in some phases of the work and that drill teeth and steel wore quickly. The rock was yielding, though, in front of the batteries of churn and wagon drills, plus a relatively new and effective opponent, a jet piercing machine. The jet piercer's flame burns its way through the rock.

Each of the Beauharnois locks will have a lift of 42 feet; each will require 350,000 cubic yards of concrete. Three

Canadian Seaway Article Is Coming

CONSTRUCTION highlights of the Canadian phase of the St. Lawrence Seaway will be reviewed in a future issue of *Excavating Engineer*. A field writer spent more than a week touring the project, from Montreal, Que., to Iroquois, Ont., gathering information and shooting photographs of channel and lock construction.

50-ft. high wall forms are being utilized in the lower lock, where concrete pouring by cranes is advancing on schedule. Concrete pouring in the upper lock had barely begun, but a full schedule of pouring with conveyors and cranes was to have been begun about July 1. Primary concern in the upper lock was blasting and digging through a massive fault zone containing 200,000 yards of sandstone.

Channel dredging constitutes almost all of the work between Beauharnois and the Massena-Cornwall area. And what bustle the Milwaukeeans discovered at Massena and Cornwall! Here is the mecca for construction men and the sightseer who wishes to see the shape of the land changed before his eyes.

Massena and Cornwall never are completely still from the din of growling excavators, loud-throated dump trucks and the inevitable, relentless bulldozers. The din—nor the dust—does not cease at nightfall. Lighting plants cast a glow over the work areas, allowing the earthmoving and concreting crews to continue their prodigious chores.

Virtual Crash Schedule

The visitor to the pleasant motel just across the street from the 14-ft. Cornwall canal falls asleep to the sound of whining dump trucks building dikes ever higher and the hoarse horns of freighters plying through the locks and channel. There's an urgency about all this; so long deferred, the Seaway and Power projects are being built on a virtual crash schedule. Next year at this time, the Cornwall Canal will have been abandoned and the two American locks —the Eisenhower and Grasse River— opened to 14-ft. navigation. The Iroquois lock also will be ready for next navigation season, but 27-ft. navigation will not become a reality until the other four Canadian locks are opened in 1959.

One of those who greeted the Milwaukee party at Massena and accompanied it on the tour of the Seaway and Power facilities was Lewis G. Castle, administrator of the St. Lawrence Seaway Development Corp. Construction of the Eisenhower and Grasse River locks, the two most important structures under Castle's jurisdiction, is well advanced. Concreting, amounting to about 500,000 yards in each structure, is expected to be completed by about December 1.

Then will follow the erection of gates, machinery and other equipment, all of which must be in place for the opening of 14-ft. navigation next July 1. The Grasse River Lock, at the downstream end of the 10-mile Long Sault Canal, will have a maximum lift of 49 feet, same as the Eisenhower lock.

Power Project Impressive

Excavation of the Long Sault Canal, which will enable shipping to bypass the power installations, is close to schedule, according to a Seaway official. Total excavation for the canal will exceed 16 million yards.

Visitors seem particularly impressed with the Power project works at Massena-Cornwall, especially the St. Lawrence Power Dam. The dam is rising behind what has been called the world's longest cofferdam—it measures 4,200 feet and contains 60 cells, each 65 feet in diameter. The dam itself will be 3,300 feet long—half each in New York and Ontario. Each side will have 16 generators with 57,000 KW capacity each. Each of the hydraulic turbines will have a rated capacity of 79,000 hp at 81-ft. head and 85,000 hp at 87-ft. head. Height of the structure to the intake deck will be 167 feet.

Construction of the power dam, begun in September 1954, is scheduled to be completed in Setpember 1958. Approximately 2 million cubic yards of concrete will be required for the structure. The Canadians, who bring out their space heaters, canvas and other devices to ward off the cold, pour concrete all winter. Through May, they had placed 595,000 yards; at the same point, the Americans had placed 586,000 yards on their half of the structure. The Americans do not pour in the winter.

Four miles above the St. Lawrence Power Dam is the Long Sault Spillway Dam, a concrete gravity curved-axis spillway structure. It will be the control structure for the power pool. The spillway will have 30 vertical lift gates measuring 52 x 30 feet. Height of the dam above foundation is 114 feet. First stage construction of the dam has been completed; and the second stage work continues behind cofferdams that silenced the famous Long Sault Rapids. The dam will require 700,000 yards of concrete. Excavation will total 7 million yards. Construction is scheduled to be completed late in 1958.

House Takes Road

Graphic example of the relocation problems imposed by the projects was offered the tour group when its buses were obliged to pull off the highway and allow a housemover to pass. Some 38,000 acres of land—20,000 on the Canadian side and 18,000 on the American side—will be flooded when the pool is raised in 1958. The flooding imposes considerably more relocation work on the more heavily-populated Canadian side. Whole villages, including Iroquois (population 1,500) are being moved to higher ground. A total of 6,500 Canadians will be relocated. The flooding

Continued on page 62

Relocation problems are presented by the projects. Tour's buses got off the highway to make room for a displaced house. The men disembarked and photographed it.

One of Bentley's TD-24 bulldozers is off-bearing rock down a 15% grade on Sand Mountain highway job in Jackson County, Ala.

Sand Mountain Gets a Smooth-Surfaced Road

SAND Mountain in Jackson County, Ala., is 1,600 feet high. It offers a commanding and impressive overlook of a lush, green valley carved by the snaky Tennessee River.

On this Thursday in late March, though, the river was barely visible from the mountain. Yep, it was raining again, and Ed Bentley was not rejoicing within his slicker.

Bentley, who formed a distaste for bad weather when he piloted a B-25 during World War II, had had his fill of an Alabama winter that brought seemingly continuous rainfall. How could a man build a mountain road when access and haul roads were turned into practically impassable sloughs?

But, build a highway Ed Bentley, Contractor, must. He'd get it built, too, come high water or—preferably, a few warm, dry days which would enable him to get idle scrapers and haulers and another shovel on the job to join a shovel, drill and dozers that had defied the rain and mud.

Bentley's job, under a state and federal aid project to continue Alabama route 117, is for the grading and drainage of 8.5 miles from Stevenson toward Flat Rock in Jackson County. The highway, which is being built largely on new location, is much needed to replace the old gravel highway that was built down the mountain some 30 to 40 years ago.

"In fact," said Bentley between raindrops, "the old highway was paved down the mountain only recently. And, if you think the curves and hills on the dirt roads near our job are bad, you should drive down that mountain road. It has about 20 'S' curves."

The new highway will have two lanes, except for two miles up Sand Mountain, which will have three lanes. Grades in the mountain will range from 6 to 8%. Lowest elevation on Bentley's project is about 800 feet; the highest about 1,600 feet.

Excavation totals include 609,000 yards of unclassified material (clay and soft sand rock) and 350,000 to 400,000 yards of rock. All but 10% of the rock will be taken from Sand Mountain. Most of the hard stuff is highly abrasive sand rock. Some limestone with black flint is at the base of the mountain.

Before the excavation could proceed,

Contractor Ed Bentley battles rain and mud to start a project involving removal of 350,000 to 400,000 yards of rock for a highway that will replace dirt road in Jackson County, Ala.

This new 2½-yd. shovel will handle the bulk of the 350,000 to 400,000 yards of rock excavation required on 8.5-mile contract.

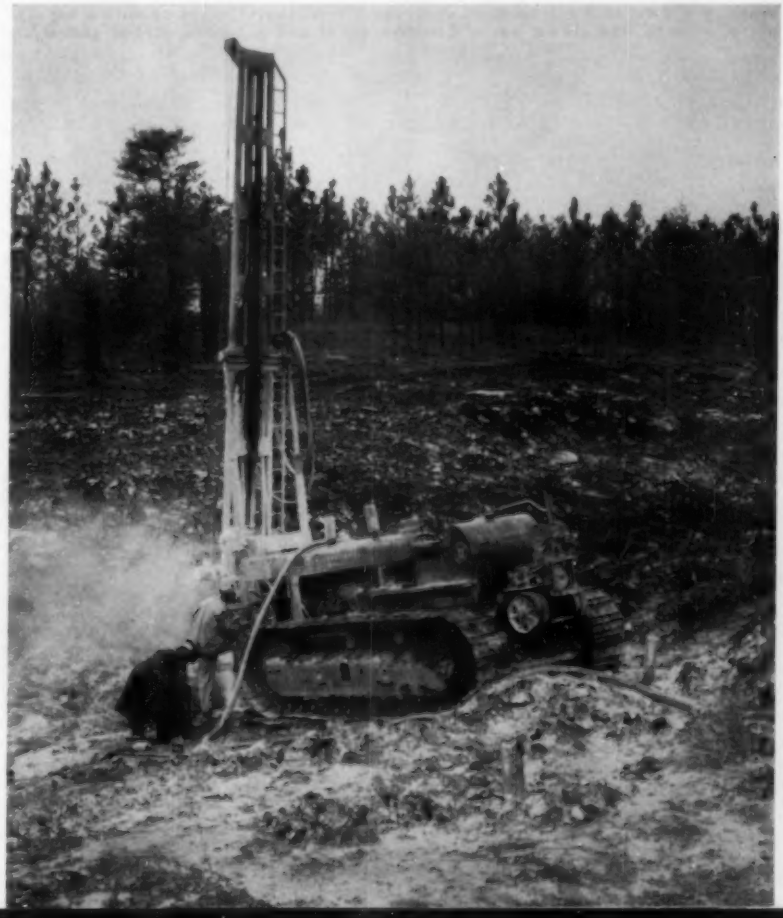
however, Bentley had to dispatch a crew of nearly 50 men to clear 140 acres of right-of-way. Armed with four Homelite power saws, these men felled virgin timber from the mountainside. Mules snaked the logs from the right-of-way. In more accessible areas, an International TD-18 dozer was used for clearing. Right-of-way widths range from 120 to 260 feet.

The exceptionally bad weather shut down the whole show many days, and the clearing work took six weeks. Only removal and burning of a few stumps was left in late March. Actual excavation work barely had gotten started.

Rock cuts will range up to 115 feet, Bentley said, and there will be some 60, 70 and 80-ft. fills. Rock sections will be undercut and a foot of cushioning dirt will be placed atop them.

The larger rock cuts will be excavated by a 2½-yd. Bucyrus-Erie 54-B shovel with a 300-hp Cummins diesel engine and a torque converter. The shovel was purchased new in January 1957.

Because of the abrasive sand rock, the



This Joy Challenger TM 500 drills 4-in. holes to prepare the rock for blasting.

dipper of the 54-B is equipped with H & L replaceable teeth. After excavating 4,000 yards of rock, the 54-B still was working on its first set of teeth.

The shovel began working in a cut that would go down 40 feet. At first, the 54-B cast excavated rock over the side of a cliff. Later, it cast rock to make haul road at a point where the end of the cut dropped off 30 to 40 feet. The haul road eventually will become a part of the highway.

A straight-drive International TD-24 dozer worked in conjunction with the 54-B, off-bearing rock down a 15% grade.

Joy Drills 4-in. Holes

Preparing the rock for blasting ahead of the shovel was a Joy Challenger TM 500 drill mounted on a TD-24 tractor. It drilled 4-in. holes on 12-ft. centers to depths ranging from 25 to 45 feet. Crevices and cavities in the rock caused Bentley to shoot the holes with 3½-in. Hercules powder, 60% extra dynamite. Fragmentation had been good and no secondary drilling was necessary.

A Chicago Pneumatic CP 600-cfm rotary compressor supplied air to the drill.

Bentley planned to bring from his home base at Sylacauga, Ala., a ¾-yd. Bucyrus-Erie 22-B shovel to work in the smaller rock cuts. It would load to three or four 5-yd. Chevrolet dumps.

Sitting idle in Bentley's yard at the job site until the weather improved were three International 22-ton Payhauler end dumps and two 18-yd. International T-75 scrapers. The end dumps will work under the 54-B. If necessary, Bentley will further increase his scraper fleet with three LeTourneau-Westinghouse Super C's. Another TD-18 bulldozer also was to be added. Two Galion motor patrols will maintain haul roads.

Though it was too wet for scrapers and dump trucks, bulldozers still could

Owner Ed Bentley (right) talks with Mickey Landers (center), job superintendent, and W. A. Stoffregen, concrete foreman. Bad winter weather hampered progress.

Working in a cut that will be 40-ft. deep, the 2½-yd. shovel comes up with a big dipperful of rock. The shovel has a Cummins diesel and a torsion torque converter.

A TD-24 dozer pulls a Let-WesCo H-3 plow to break ground ahead of scrapers.

maneuver, and one of two TD-24's on the job was making ready for the scrapers by breaking ground 24 to 30 inches deep with a LeTourneau H-3 plow.

Hauls will be short, averaging about 500 to 600 feet. Less than 60,000 yards of material will have to be hauled more than 1,000 feet, according to first estimates.

The job requires 95% compaction, which will be accomplished with an International tractor.

Bentley's contract includes the construction of five culverts, the largest a 7 x 8. Much drainage work is included. Nearly 200 feet of 42-in. metal corrugated pipe will be placed. Other pipe sizes range from 15 through 30 inches in diameter. Chicago Pneumatic and Ingersoll-Rand hand drills, Ingersoll-Rand spades and Thor tampers were being used on pipe and culvert work. A Jaeger 125 compressor supplied air.

Divert a Stream

Near the spot where the 54-B started to work is a stream which runs through the middle of the right-of-way. Bentley's plan was to dig a ditch five feet deeper than the roadbed and channel the stream about 150 feet to a culvert, where it would cross the road going down the side of the mountain.

With the job at its peak, Bentley expected to employ a maximum of 40 to 60 men. He planned to put drilling, and perhaps hauling, work on two shifts.

Maintenance work is being done in the field. Four 30 to 32-ft. semi-trailer storage units also are on the scene. Equipment is serviced with fuel from a 4,000-gallon semi-trailer tanker. Three 500 to 550-gallon fuel tanks are on the grounds.

An Alemite grease unit is mounted on a Chevrolet flatbed truck. The unit contains a multi-purpose greaser, a roller greaser and a transmission grease gun.

Red-headed Mickey Landers, who became a beaming new father on that dreary March day, is Bentley's job superintendent. Other job officials include: W. A. Stoffregen, concrete foreman; Mack Underwood, drilling and blasting superintendent; and James Robinson, grade foreman.

Bentley, now 36, has come a long way since he left his B-25 behind and started a construction business in 1947 with a "couple of tractors, pans and bulldozers."

Bentley is fond of the view from Sand Mountain, but he'd prefer to look on a dry day with all of his equipment roaring. All this rain is strictly for ducks—not trucks.

Using a grinder attached to a 600-cfm compressor, a driller works on a bit for the Joy drill. Blast holes were drilled on 12-ft. centers to depths of from 25 to 45 feet.

A leveling chore is performed by the same TD-24. Scrapers and hauling units could not work until the weather improved. Bentley planned to bring in a ¾-yd. shovel.

Mike Starvaggi, mining firm's president, assists his wife in christening machine with champagne. On speaker's platform is Anthony Battaglia, secretary-treasurer of firm.

West Virginia Firm Dedicates Big Walker

ONE of the coal industry's largest excavators was dedicated June 15 at the strip mining fields of Weirton Construction Co. on the West Virginia-Pennsylvania border approximately 25 miles southwest of Pittsburgh, Pa.

The 33-cu. yd. walking dragline—a Bucyrus-Erie 1250-B—is the largest capacity machine in that series. The new unit has a 200-ft. boom and is powered by electric motors having a total output of 4,950 hp.

Owner of the big stripper is Mike Starvaggi, head of Starvaggi Enterprises, Weirton, W. Va., and president of Weirton Construction Co. The mining firm will use the machine to strip overburden from coal deposits currently being worked near the Pennsylvania township of Hanover. The seam is bituminous Pittsburgh Eight running 58 inches thick. The entire mining property of the firm covers some 6,000 acres.

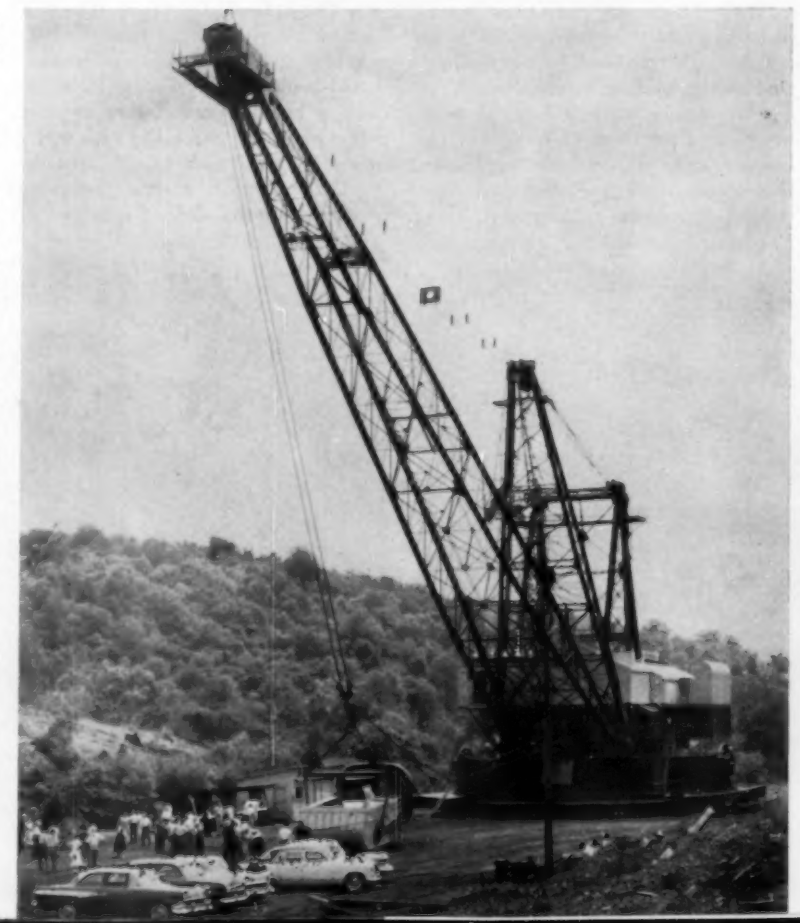
Largest walking dragline in 1250-B series has a 33-cu. yd. bucket and a 200-ft. boom.

Main event of the dedication program was a formal christening ceremony at which the name *Angeline* was bestowed on the new unit in honor of Angeline Starvaggi, wife of the firm's president. About 100 persons witnessed the event. Guests included executives of Weirton Steel Co., which purchases most of the mine's production; members of various Starvaggi enterprises; local officials; manufacturers' representatives; and members of the press.

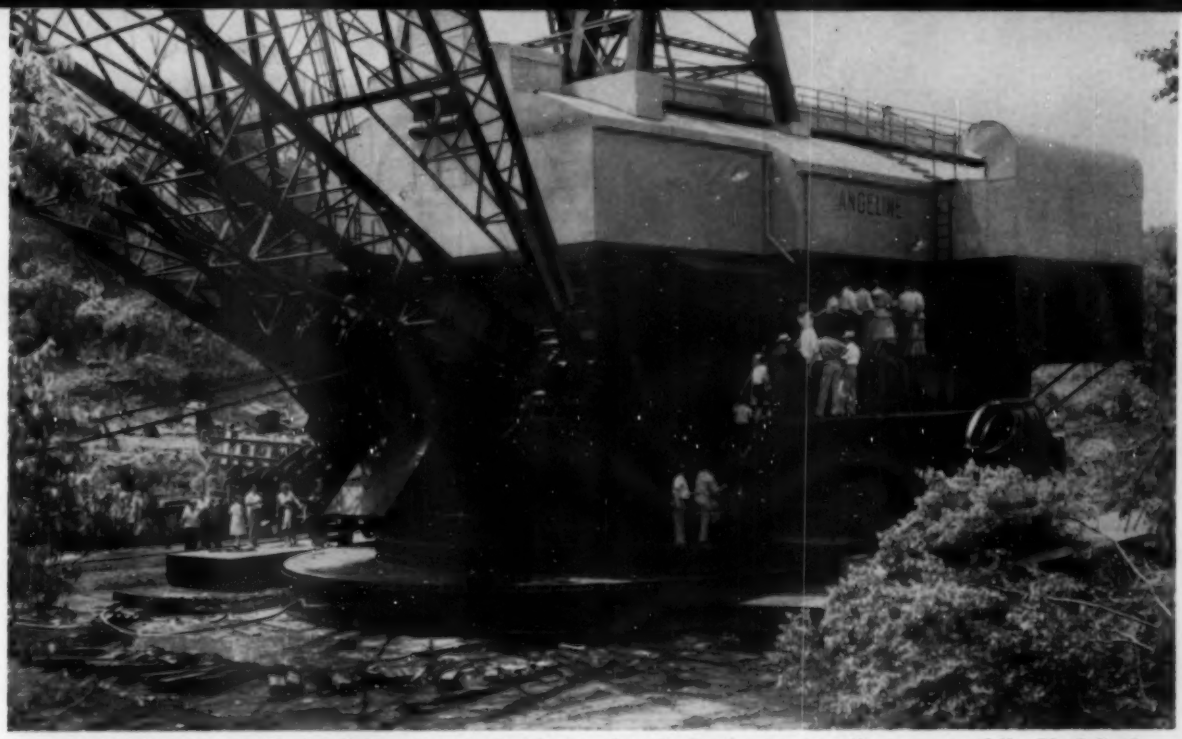
Inspect Equipment

Officials pointed out to visitors during an inspection tour the size of the machine and its various components. Its height from the tip of the boom to ground level is the equivalent of 11 stories. It has a 50-ft. diameter circular base which provides a solid working foundation. Working weight of the dragline is approximately 2.9 million pounds. Bearing area of the base is 1,965 square feet, giving a bearing pressure on the ground of 1,500 pounds per square foot.

Walking shoes of the traction mechanism are 54 feet long and 9 feet wide. The walking operation is accomplished through the simultaneous placing of



Dragline's 200-ft. boom towers above guests to height 100 feet above ground.



A group of visitors boards the *Angeline* to inspect electrical equipment. Another group gathers on one of the 54 x 9-ft. shoes.

the shoes on the ground and tilting and skidding the entire machine and its base on the ground. The dragline moves at the top speed of about .2 mph and takes a 7½-ft. stride with each step of the shoes. A 2,000-ft. long trailing electric cable furnishes power to the impressive machine.

The *Angeline* has an operating radius of 191 feet and a maximum lifting capacity of 160,000 pounds. It can dig to a depth of 120 feet and, when it does, the tip of the boom is 234 feet from the bucket. An 18-story building could be built in the excavation under the boom. The 33-yd. bucket is a Bucyrus-Erie heavy-duty BH type.

Boom Tip Moves 26 mph

During rotation of the machine, the tip of the 200-ft. long boom is calculated to be moving at 26 mph.

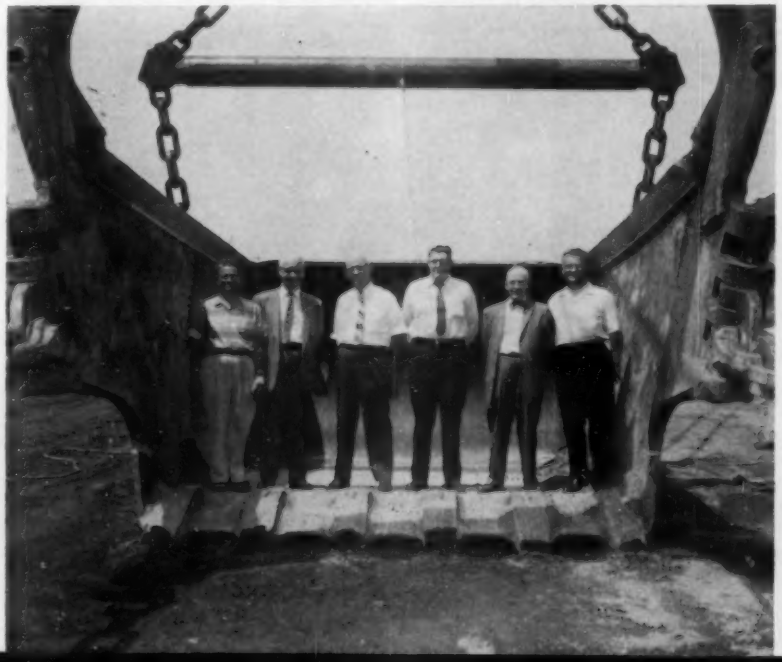
Twelve General Electric motors capable of producing a total of 4,950 hp power the dragline. Two main alternating current motors power the generators, furnishing direct current power for the drag, hoist, swing and walking motors, and for excitation. One is a 1,500-hp synchronous driving unit; the other is a 600-hp induction unit. The main functional DC motors consist of two hoist motors rated at 500-hp each; two drag motors at 500-hp each; four swing motors at 137½-hp each; and two walking motors at 150-hp each. The dragline operates through amplodyne rotating control.

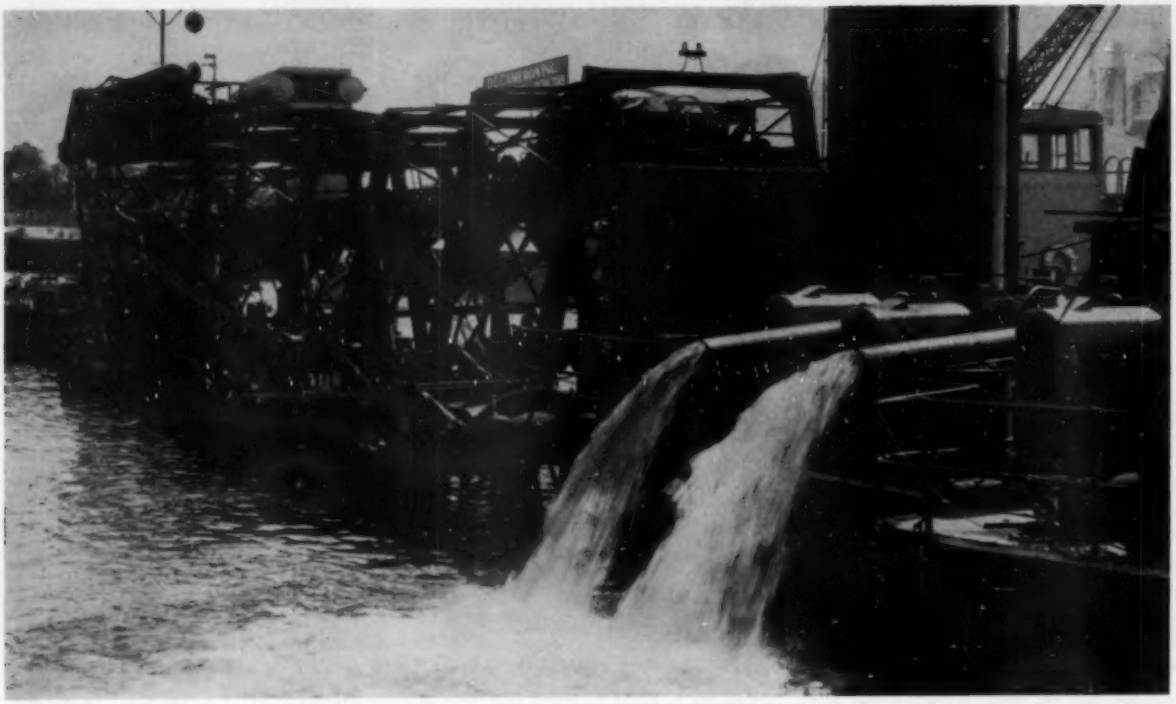
Stewart Bolling, Marland Heights, W. Va., is chief operator for the *Angeline*, which will work three shifts a day. He operated the first stripper purchased by the Starvaggi firm in 1940. This first unit was a 2-yd. rig. As the firm gradually went deeper into the earth to uncover coal, larger stripping machines became necessary to move the overburden. In 1944, Starvaggi acquired a 6-yd. dragline with 100-ft. boom; then in 1947 a 10-yd. dragline was added. The new 33-yd. dragline was ordered in 1955.

Shipping of the machine from the manufacturer's South Milwaukee (Wis.) plant began in January 1957. Fifty railroad cars were necessary to deliver the machine to the Pennsylvania site. Assembling of the various sections took more than five months.

Weirton Construction Co. officials include Anthony Battaglia, secretary-treasurer; A. T. Bundy, assistant secretary; John Sorrenti, purchasing agent; Frank Skrypak, general superintendent; and Joseph Micelli, maintenance supervisor.

Posing with Mike Starvaggi (left) are Dave N. Thomas, county commissioner; Charles Carr, Sr., vice president, and Richard W. Grace, superintendent, Weirton Steel Co.; J. Frank McHendry, Weirton businessman; and Samuel Kusic, mayor of Weirton.





A group of 10-in. Moretrench pumps were alternately opened up and shut down to keep the ship from capsizing as it rose.

Chicago Contractor Beats 'Impossible' Salvage Job

Tackling job of raising abandoned 2,300-ton steamer Gilbert from Calumet River bottom, D. C. Cameron, Inc., shows that skill and good equipment bring success to hazardous work.

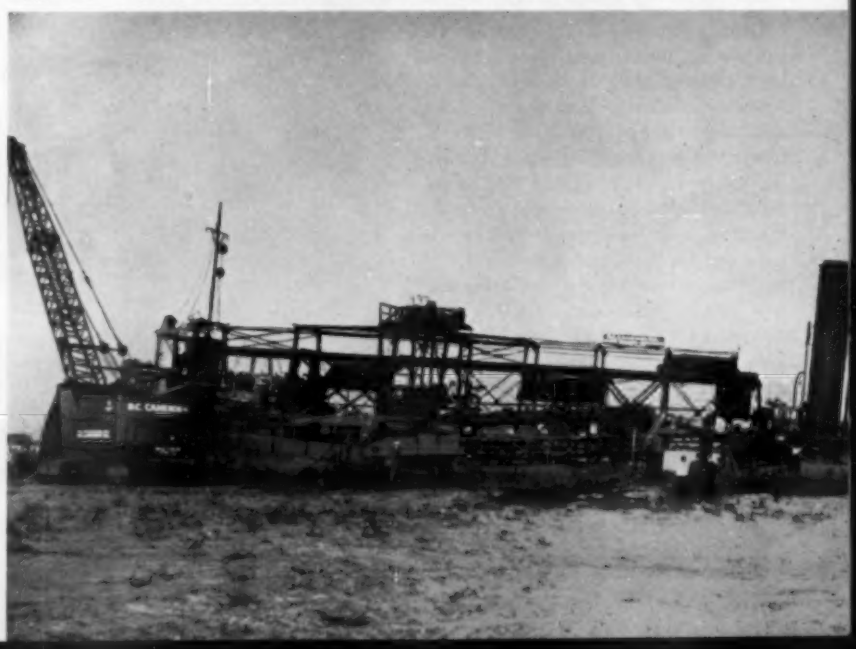
RAISING of the sandsucker *Gilbert*, which sank following a hit-and-run accident in the busy Calumet River on Chicago's far south side, proved to be an interesting and hazardous operation.

The salvaging job was not the ordinary variety. The work was so tough that one experienced salvage firm gave it up as impossible. When it was finally completed successfully by a Chicago firm, D. C. Cameron, Inc., Engineers & Contractors, construction equipment played an important part in bringing up the vessel.

The story begins on the night of May 3, 1956. The *Gilbert*, a 2,300-ton vessel powered by coal-fired boilers and constructed of heavy ⅛-in. plate according to shipbuilding practice years ago, was moored on the west bank of the Calumet at 103rd Street at the property of Material Service Corp., a large supplier of sand, gravel and concrete. The ship was fitted out with hoppers and hydraulic suction equipment of a sand boat. Its owner was Lake Sand Corp., Chicago.

The collision of some unknown vessel with the tied-up *Gilbert* is thought to have occurred about midnight. No one was aboard the sand boat. A watchman making his rounds discovered that the ship was listing and immediately called for help. The blow which had been struck the ship left a gaping hole three

Guy lines from ship to shore are operated by a pair of 38-B cranes. Cameron rigged up a system of blocks and falls which gave each crane 60 tons of pull.



feet below waterline on the starboard stern. Despite efforts of crewmen to stop the flooding, the ship settled slowly and touched bottom of the 26-ft. minimum depth channel by 9:00 a.m. the following morning, May 4.

As the ship sank, the bow drifted away from the dockline bringing the *Gilbert* into a position almost diagonally across the Calumet River. About two-thirds of the river was blocked off leaving only 110 feet of clearance between the ship and the opposite shore. This situation was extremely hazardous for the long ore boats and bulk carriers that continuously ply up and down the river. The busy Calumet River provides the passageway for ships between Lake Michigan and Chicago's vast inland industrial harbor.

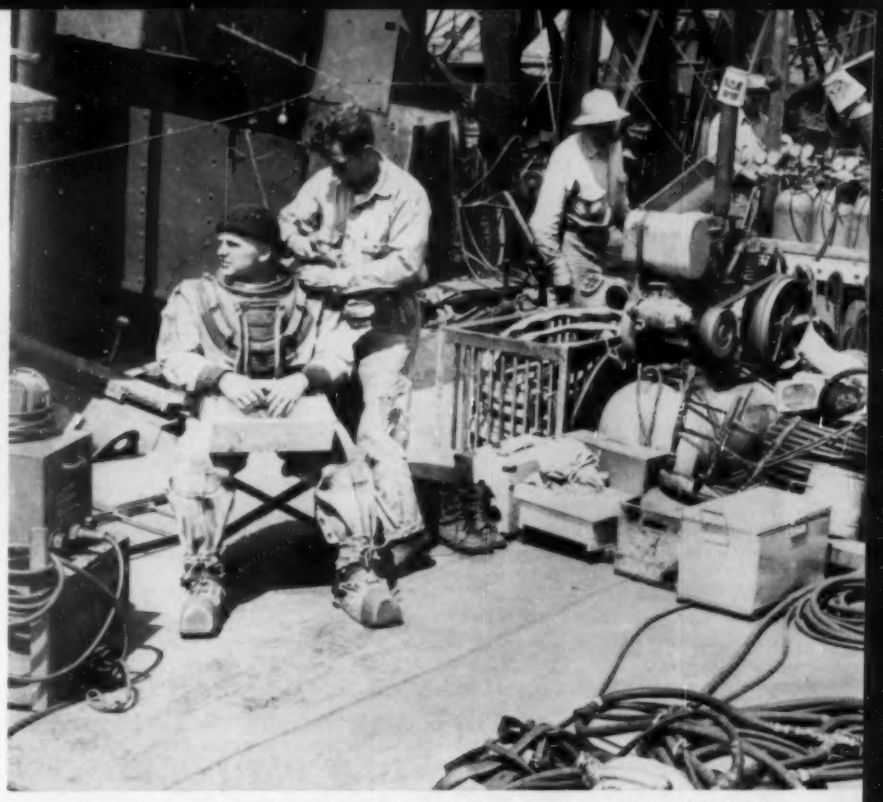
Navigation Hazard

Large ships could clear the sunken vessel, but only with difficulty since the river depth ranges from 20 to 26 feet, becoming shallower toward the shore. Normal two-way ship traffic on the river was reduced to one lane.

The vessel, which was 208 feet long and had a 42-ft. beam, normally drew 16 feet of water. The bow of the ship was now submerged in deep water in the midstream; the stern and much of the superstructure was above the waterline in shallower water at the bank.

The *Gilbert's* insurance company quickly awarded a salvage wrecking firm a contract to remove the obstruction and the contractor went to work. Divers explored the submerged portion of the ship. They came up with the report that the ship was riddled with holes large and small and could not be pumped out.

After several weeks of effort, this contractor gave up in failure. Lake Sand Corp. and the insurance company then abandoned the ship to the U. S. Corps of Engineers, the government agency responsible for maintenance of navigable waterways. Due to reports of holes in bottom of the ship at bow end, the consensus was that to remove the ship from the channel divers would have to cut it apart with underwater acetylene torches and remove it piece by piece. This cutting job would take about three to four months of work. It would cost an estimated $150,000. In the meantime, traffic would be slowed down skirting around the hulk in the river, and there was imminent danger that another collision might choke off all ship movement completely.



A crew gets diver and air supply equipment set for the descent into the river's muddy water. All work underwater had to be done by feel because of poor visibility.

With this in view the owners formally abandoned all their rights in the *Gilbert* to the Chicago district of the Corps of Engineers, which is headed by Col. J. B. W. Corey, Jr., district engineer. Bids to remove the hulk were requested promptly, and, of five bidders, D. C. Cameron, Inc., was the lowest. The firm was awarded a contract on July 31. Under specifications, Cameron had 28 days to raise the *Gilbert* and move it out of the channel. The Corps required the firm to furnish a $100,000 performance bond to insure completion of contract. Fred Wachendorf was in charge on the job for the Corps.

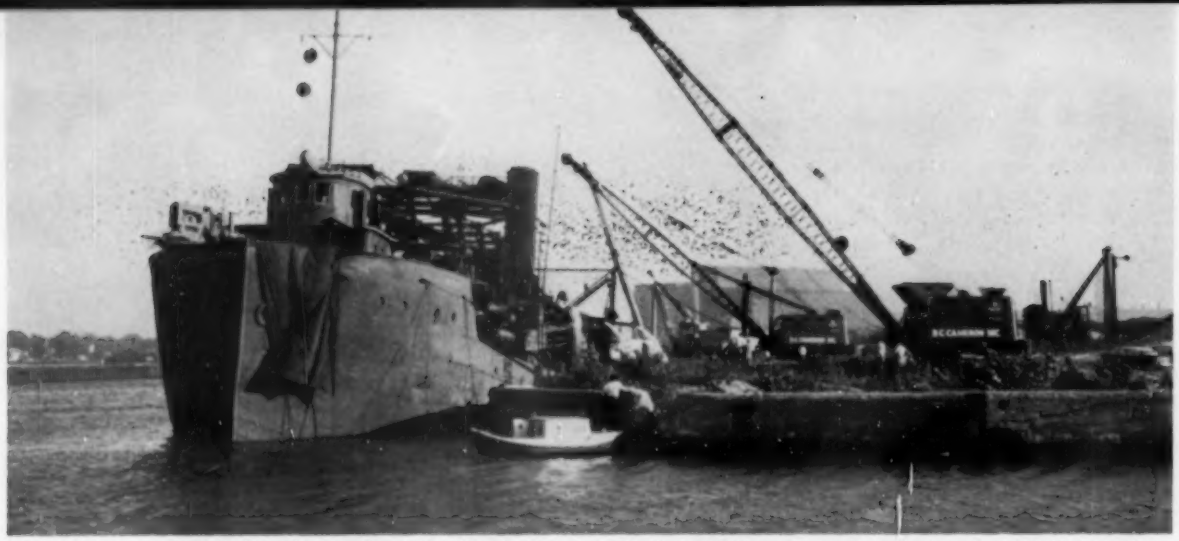
Mindful of the heavy risks and time involved, a crew of 20 men under the personal supervision of Dan Cameron, president of the firm, started salvage operations August 1.

The men had to work fast and cautiously. Divers, headed by Frank Hefling, began to give the ship a methodical going-over. Because of the dark, muddy waters underwater vision was impossible, even for a few inches. All work on the vessel had to be done by sense of touch. To complicate matters further, no drawings of the layout of the ship's bulkheads or fittings were available.

Divers Plug Holes

Cameron set up a system of painters' scaffolds which enabled divers to explore the ship inch by inch and plug up the larger holes in the vessel as they went along. Standing on the scaffolds, two divers were lowered into the murky river. Lines were marked every two feet on the scaffold ropes. Each diver then communicated by telephone with the men serving on the diving scow above when he wanted to be lowered or raised.

A variety of materials—pieces of plywood, sawed-off sections of cedar posts, canvas and ⅛-in. thick steel plate—served to patch up all holes over 2-in. diameter. Using his own acetylene torch specially-designed for underwater work



After three unsuccessful attempts to refloat the ship, Cameron finally brought it up on an even keel and pulled it into shore.

Head Diver Frank Hefling cut away twisted and torn metal and then made repairs, bolting on steel plates and other materials.

The hazards of the divers' work were aggravated at times by "hot rod" pleasure cruisers speeding past the salvage site, ignoring slow signs and red flags posted by the crews. The wash of the small craft slapped against the work scows shoving them against the hull and making the ticklish job of handling divers' air lines even more difficult.

Finally, with the ship plugged up except for minor leaks, Cameron turned to the job of pumping. Equipment had been placed while divers were plugging leaks in the hull. The pusher tug *Sydney* and additional wrecking scows were standing by. On shore two Bucyrus-Erie 38-B cranes were stationed; one was equipped with 75-ft. boom, the other with 60-ft. A floating derrick with 85-ft. boom was also ready for use.

For the pumping equipment, Cameron called on the Moretrench Corp., Rockaway, N. J. Larry Kelley, vice president and western manager of the firm supplied 12 centrifugal 10-in. Moretrench well point pumps. They were model JXD units powered by 60-hp Hercules gasoline engines and each had a rated capacity of 2,000 gpm. A special pump raft was constructed of 12x12 timbers and the pumps were installed on the raft deck by a 38-B crane. Pumps were also positioned at various points on the ship. In addition, five Sterling 3-in. clean-up pumps were fitted out with flexible rubber suctions to handle miscellaneous pumping jobs, including the removal of 700 tons of deadwater from flooded sand-hoppers in the ship.

To steady the ship as she came up and to draw the bow end into shore, Cameron set up a system of blocks and falls which provided the necessary pulling power. Heavy shackles and cable slings were welded on and attached to the bow and stern ends of the ship. A pair of single-line cables was then strung out to the ship from deadmen buried on shore and thence to the blocks-and-falls. This setup gave the effect of an 8-part line since each of the double falls consisted of four sets of sheaves. From the blocks-and-falls gear, a single-part cable was attached to the drag drums of each of the 38-B's through the fairlead sheaves located at the foot of the crane boom. Each 38-B could then exercise about 60 tons of pull through this system. Cable used on the cranes and steel blocks was $\frac{7}{8}$-in. diameter. Lines leading to the ship were $1\frac{1}{2}$-in.

Dan Cameron (left) gets a congratulatory handshake from Fred Wachendorf of the Corps of Engineers' South Chicago district, after contract was completed.

Begin Pumping

During the third week of operations, the tricky task of pumping out the ship began. Cameron operated the pumps with extreme caution watching the keel of the ship. With all 12 pumps working simultaneously and at full capacity, the ship would rise fast—too fast to be controlled properly. Therefore, Cameron would shut down the pumps individually as necessary to prevent the ship from rolling over on its side. As the pumps were shut down, the water flowed back into the ship and she sank again.

Three attempts were made to refloat the old ship, but complications quashed each effort. Doors caved in; patches worked loose; dangerous lists forced the pumps to shut down; new holes opened; the stern rose but not the bow; and the bow rose but not the stern. Each time the ship rose, the 38-B's drew in the guy lines made fast to the bow and stern of the ship, gradually moving the ship toward the dockwall.

After the third attempt ended in failure, Cameron's two divers installed a

wooden cofferdam around the top of the cargo hold to pump out deadwater. This weight of 700 tons was causing the ship to list dangerously when water was pumped from the hull and the ship started to rise.

The fourth and last try was made on August 21. The salvors were successful in obtaining the proper center of gravity and the *Gilbert* came up to stay. The pumps went to work at full head and dried out the hold. Tow lines brought the ship in parallel to the dock and she was made fast.

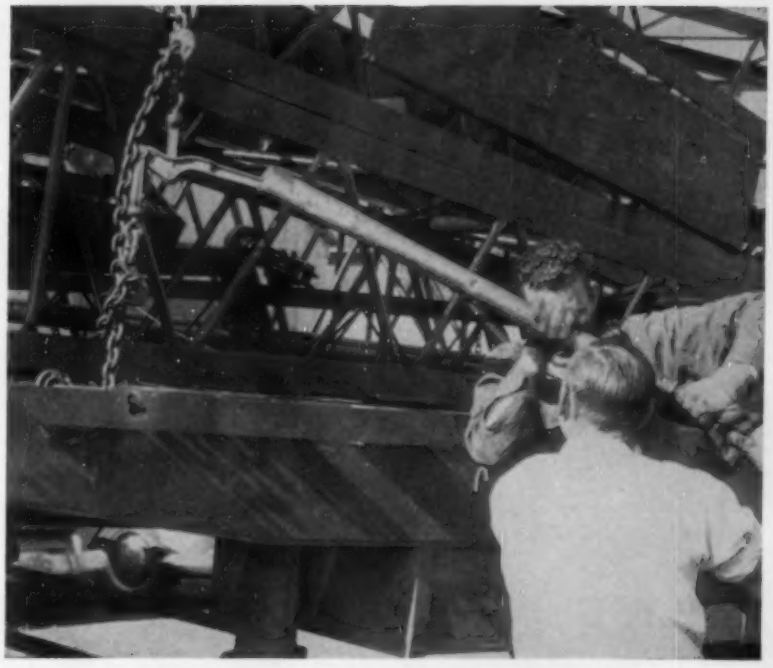
With seven days of contract time remaining, the firm had cleared the channel and earned its money. The *Gilbert* later was towed to a private slip for reconditioning as a diesel-electric powered craft.

Dan Cameron attributes his success in raising the *Gilbert* in large part to the skill of his men and also to dependable equipment. "The extra power and dependability in our pumps and cranes made the difference between success and failure," Cameron recalled, sitting in his office in the downtown Loop talking to *Excavating Engineer's* reporter. "If either had failed us at a critical time, the ship would have rolled over on us and caused us to spend considerably more money. The pumps which we rented from Moretrench were in excellent operating condition. We believe in keeping up our own equipment the same way. Having the best equipment available never hurt any contractor."

Forms Own Firm

Dan Cameron is one of the oldest active marine construction superintendents on the Great Lakes. He has been in the business 47 years. He served with Great Lakes Dredge & Dock Co., Chicago, for 23 years as a traveling marine superintendent. Two years ago he formed his own firm, the present D. C. Cameron, Inc.

The firm specializes in design engineering, serving as consultant in marine structures to a number of cities on the Great Lakes. The firm also performs marine contracting, including bridge foundations, steel and concrete docks, breakwaters, intakes, sewers and pile driving. It has also done heavy steel construction for three large steel mills in the Chicago area. It recently drove the wood piles for the foundations of a pair of 6½-million bushel grain elevators in Calumet Lake for the Chicago Regional Port Authority, as a sub-contractor for the James Stewart Corp., Chicago.



THIS LOAD WILL STAY PUT . . . ACROSS TOWN — ACROSS COUNTRY

There's no doubt about the safety of this load—or any load secured with Lebus Loadbinders. Completely drop forged, then heat treated for even more strength and durability, the millions of Lebus Loadbinders already in use have proved their ability to tie down loads of every description—keep them absolutely secured without failure *until they're released!*

You get an idea of this loadbinder's strength from the photo above. Two big truckers throw their combined weight on a long cheater without fear of breaking or bending any part—they know that, from handle to hooks, the Lebus is the strongest Loadbinder manufactured. You're assured of safe, dependable performance because each Loadbinder is thoroughly proof tested before shipment.

Equally important is the Lebus Loadbinder's convenience and safety of operation. Once the binder is locked in position, it can't snap open. Even shifting loads won't spread the handle! Exclusive Lebus designed ball and socket swivel is drop forged—won't pull apart regardless of the load! Get complete details on the number one loadbinder in every industry from Crosby Laughlin Lebus Distributors!

WORKERS PROTECTED

Workers and materials are protected with Crosby-Laughlin Safety Hooks that keep the load in place *until it's released!* A rust-proof, non-jamming latch and spring provides a simple but safe method of keeping rings and slings

on the hook, even when the load is set down! Tough Crosby-Laughlin Hooks are drop forged then carefully heat treated. The result is superior strength and quality from a design that eliminates excess weight. Crosby-Laughlin safety and standard hooks are available in eye, hoist, shank and swivel types to give you the exact design you need. Capacities range up to 20 tons! See your nearby distributor for catalogs and technical information on a complete line of fittings!

World's Most Complete Line of Fittings For Wire Rope and Chain

CROSBY LAUGHLIN LEBUS

FORT WAYNE 1, INDIANA

A "robot" tractor is tested at U. S. Army's Fort Belvoir (Va.) research laboratory. Tournatractor is radio-controlled from jeep.

News from the Field

"Robot" Tractor Tested

Remote control is being used to operate a tractor at the United States Army Research and Development Laboratories, Fort Belvoir, Va. The tractor, a standard commercial Tournatractor manufactured by the LeTourneau-Westinghouse Co., Peoria, Ill., can be operated anywhere within practical range of the radio (up to 15 miles) by which it is controlled.

Positioned in a jeep or helicopter equipped with a standard military radio transmitter and a special control box, the operator can start and stop the machine, engage and disengage the gears, operate in forward and reverse, manipulate the dozer blade up and down and activate the steering mechanism.

Only visible change to the Tournatractor is substitution of a standard military radio receiving set for the operator's seat. Manual controls have been retained for conventional operations. Army engineers feel that installation of small television cameras on the tractor would give the remote operator additional knowledge and observation of the machine and also enable him to work it without relayed information from a visual observer.

Army technician manipulates buttons on control box governing tractor moves.

The army believes that the "robot" tractor could prove to be a valuable tool in construction work in radioactivated and combat zones.

As a safety precaution, early tests have been held with the tractor and control point within easy viewing distance. The tractor will be operated from greater distances as the test schedule progresses.

Allen Joins B-E

Robert G. Allen has been elected to a new vice presidency created by Bucyrus-Erie Co., South Milwaukee (Wis.) excavator and drill manufacturer.

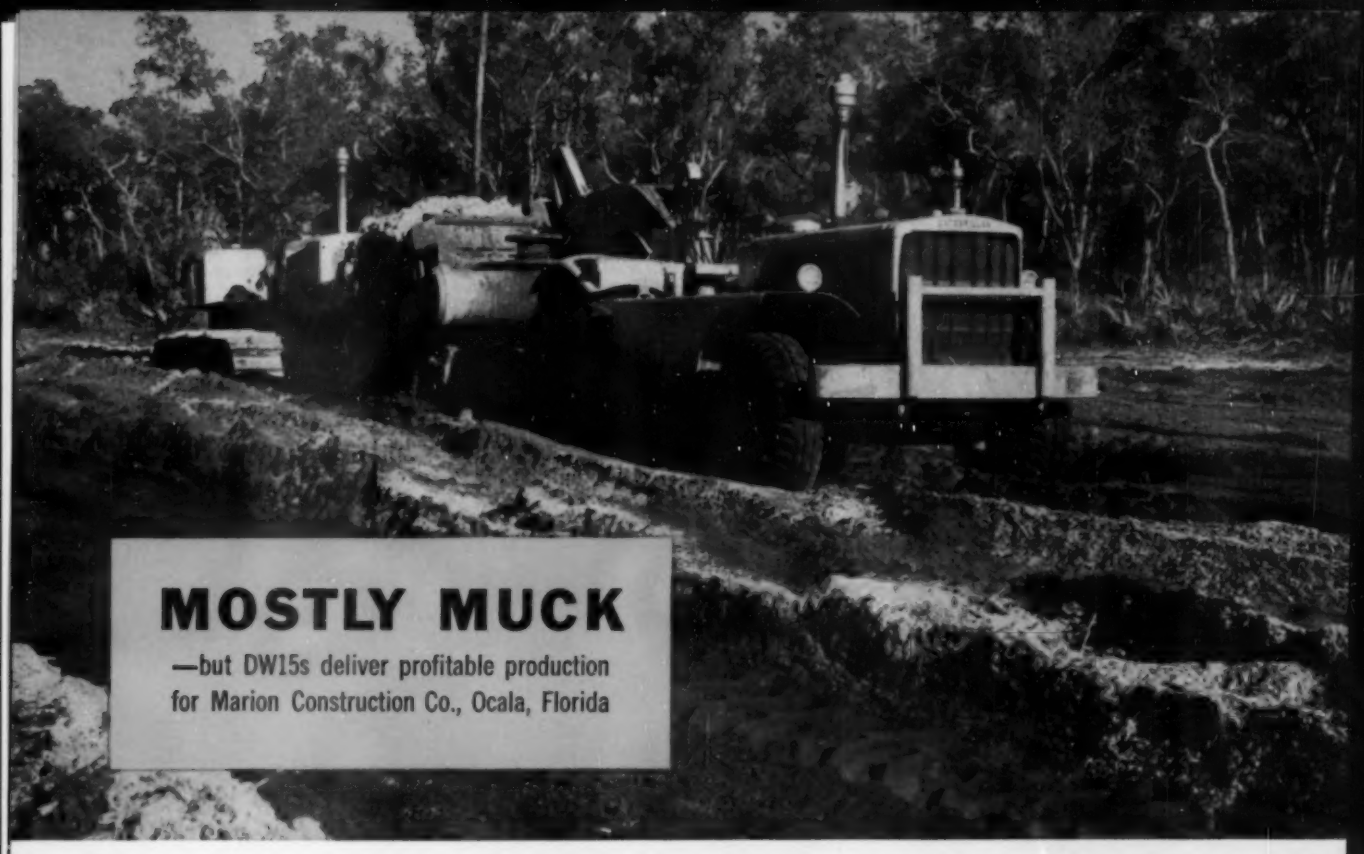
Allen's election, by the board of directors, became effective July 1. Before that he was president of the Pesco Products and Wooster divisions of the Borg-Warner Corp., at Bedford and Wooster, Ohio. He lived in Cleveland.

Allen, 54, served two terms in Congress, from 1937-'41, representing Pennsylvania's 28th district. He was a member of the foreign affairs committee. During World War II he was a lieutenant colonel in the ordnance department and was attached to the Central Pacific Command.

Before joining Borg-Warner, he was vice president of the Great Lakes Carbon Corp., New York, and general manager of its electrode division with plants in Morganton, N. C., and Niagara Falls, N. Y. He formerly was president of the Duff-Norton Mfg. Co., Pittsburgh, Pa. His business career began at the Wal-

Continued on page 48

Robert G. Allen



MOSTLY MUCK

—but DW15s deliver profitable production for Marion Construction Co., Ocala, Florida

This is one of four CAT* DW15s with scrapers building a 15.5-mile stretch of 2-lane blacktop on U. S. 1 between Jacksonville and St. Augustine. A D8 is push-loading it. This job is only 3 feet above sea level, and the material is wet and heavy. There are some 370,000 cu. yd. to be excavated and moved for fill on the stretch.

Marion Constr. Co. is making 2 uses of the borrow pits: (1) to get fill and (2) to provide drainage ditches for the road. On 6,000-foot round-trip hauls, the DW15s averaged 150 cu. yd. an hour each. They worked 10 hours a day, 6 days a week. According to Vice President Shaw Pearsall they performed excellently and with a minimum of down time in the tough going.

Now a new DW15 (Series E) Tractor with a new No. 428 LOWBOWL Scraper

All rugged yellow machines are engineered to handle the *hard* work profitably. But, as productive as they are, Caterpillar is constantly looking for ways to improve their performance. When a new model has been thoroughly job tested, it is made available. And that's the case of the new DW15 (Series E)-No. 428 LOWBOWL Scraper. The high torque Cat Engine delivers 200 HP (maximum output capacity). With speeds up to 37.2 MPH, plus the extra sure-footedness of four wheels, the DW15 gives you faster hauls and cycle times with greater safety. The No. 428 Scraper has a capacity of 13 cu. yd. struck and 18 cu. yd. heaped. Because of exclusive LOWBOWL design, it loads quicker and more easily than any unit of its capacity—another factor in high production at low cost.

For complete details about the new DW15, see your Caterpillar Dealer.

And remember, he backs you with round-the-clock service and parts you can trust. Just you name the date—he'll be glad to demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

THE LATEST, MOST COMPLETE INFORMATION ON THE NEW HIGHWAY PROGRAM — FREE

Here in one booklet is *all* the latest information on the new highway program. Find out how, where and when the money will be spent; standards for the new freeways; final routes of the Interstate System. Everything you need to know to share in the greatest construction job in history.

Dept. EE-8, Caterpillar Tractor Co.
Peoria, Ill.

Please send me immediately ..... copies of "The Road Ahead."

Name.....

Company.....

Address.....

City..... State.....

ON THE CONNECTICUT TURNPIKE

No place for trucks you have to "baby"! Gammino's Macks are hauling close to *seven million* yards of rock and earth as the Connecticut Turnpike is rushed to completion. That means those mighty shovels are really moving as they drop the heavy, jarring loads of rock into the trucks beneath. It also means that Gammino's Macks are taking tremendous punishment, both from the hustling shovels and from the makeshift roadbeds over which they operate in an endless loading-dumping cycle.

"Sure, it's backbreaking work for any other truck," says Mr. Gammino. "That's why we use Macks."

No job's too tough for Gammino, because... THEY

Want the real pitch on Mack can-do?

Ask Frank Gammino of M. A. Gammino Construction Company, Providence, Rhode Island. He'll talk Macks with you all afternoon.

Ask him about the small but important jobs, where Mack economy enables him to deliver at a profit.

Ask him about the big jobs, where the power and schedule-meeting dependability of his Macks pace the entire operation.

And ask him about the really rugged jobs—the chassis-jolting rock-loading jobs . . . the up-to-the-hubs-in-mud jobs . . . the jobs where his Macks work round the clock, rushing out big-yardage loads for weeks on end without a break or a breakdown.

Then ask him why he has still *more* Macks on order. We'll stand on that. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

YEAR AFTER YEAR IN THE U. S. A., MACK DIESEL TRUCKS OUTSELL ALL OTHERS

ON THE PROVIDENCE RIVER BRIDGE JOB

Gammino's Macks are keeping big buckets busy. Concrete, not excuses, is what this job calls for—any late deliveries mean expensive, profit-robbing delays. "With Macks on the job," says Mr. Gammino, "no one sits on his hands."

DEPEND ON MACKS

ON OVER-THE-ROAD HAULING OF CRUSHED STONE AND DIRT

. . . a wise contractor keeps a close eye on running costs—fuel, maintenance, down time, tire wear, etc. Mr. Gammino does just that, and he reports: "Nothing touches a Mack for ton-mile economy."

MACK
first name for
TRUCKS

5297

NOT in the Contract

The infantry patrol was on maneuvers on a hot day in the desert. Time was called for a break. One recruit sat idly on a stone, his head in his hands.

"What's the matter with him?" asked the sergeant.

"Homesickness," answered a private. "We've all got that."

"Yes, but this is worse than for most of us—his father owns a tavern."

Driving in a dense fog, a motorist followed the tail light ahead for a full hour, free from worry. Suddenly the red beacon stopped, and the two cars collided.

"Hey, why don't you put out your hand when you're going to stop?" yelled the man behind.

Came the casual reply: "Why should I? I'm in my own garage!"

A father who had been finding it rather expensive keeping a popular son in high school, returned home one evening to be met at the door by his wife.

Beaming broadly, she gave him a quick kiss and burst out:

"I can't wait to tell you, Dear! You know those economy lessons you've been giving Junior? Well, they're finally beginning to bear fruit! He told me today what he wants for his birthday—and it will cost only 75 cents!"

"Well, well!" beamed the delighted father. "And what does he want?"

"Just one little thing," the wife responded. "He wants his own set of keys to the car!"

Mountain guide: "Do be careful not to fall—it's very dangerous. But if you do fall remember to look to the left. You get a wonderful view."

Coach of college basketball team: "What's biting our all-star center? He's been sulking for a couple of weeks."

Assistant coach: "It's his father. He keeps writing the kid for money all the time."

As the doc said to the patient as he sewed him up, "That will be enough out of you."

A white-haired old man approached his doctor and said: "Doc, I'm slowly going nuts over women. Is there any way to speed it up?"

Hear about the octopus who fell into the cement mixer? Just a crazy mixed up squid.

Warden: "Boys, I've had charge of this prison for ten years and we ought to celebrate the occasion. What kind of party would you suggest?"

Prisoners (in unison): "Open house."

"The best thing you can do is give up drinking and smoking, go to bed early and get up early."

"I don't deserve the best, Doc. What is the second best?"

Wife: "What do you mean by coming home half drunk?"

Husband: "It's not my fault—I ran out of money."

A grizzled old prospector had struck it rich and had gone into the city for a spree. He hadn't been out of the wilds for years. First, he went into a barbershop in a suburb to get a shave. It was something he hadn't enjoyed in years.

The barber had a pet monkey which was continually imitating his owner. The barber went to the back for a few minutes and the monkey proceeded to lather the man's face. Then the monkey started stropping the razor and the old man rose up and exclaimed:

"Stop that! Ye kin tuck th' towel around my face and lather me up, but by golly yer father's got to do th' shavin'!"

A small boy lost himself at the auto show. He was crying loudly when a policeman found him and asked him what was the matter.

"I'm lost," said Charley.

"Oh," said the policeman. "Who were you with?"

"My father," said the lost child.

"And what's your father like?" the officer inquired.

"Beer and women," sobbed Charley.

"Coffee-break!"

The No. 12's part in a good team job

The Caterpillar No. 12 Motor Grader is a key piece of equipment in efficient earthmoving. By leveling fill and building and maintaining haul roads, the No. 12 helps tractor-scraper rigs handle bigger loads in faster time.

The job pictured is at Fogelsville, Pa., where W. E. Johnson had a 231,000-yard contract, relocating nearly a mile of U. S. 22. Smooth haul roads maintained by the Cat* No. 12 Motor Grader allowed three Cat DW21s pulling No. 470 Scrapers to move 4,000-6,000 yards of dirt per day.

In Mr. Johnson's words: "We're Caterpillar people. We've had a lot of experience with Cat equipment and we know when we start a job we can count on finishing it with a minimum of down time."

Construction men everywhere regard the No. 12 Motor Grader as the standard in its field. It is ruggedly built for heavy, round-the-clock work. And its balanced design and dependable four-cycle Cat Engine make it a big producer. Operators like the fast, positive controls, easy blade positioning and unobstructed visibility from the seat. Most tire down time is eliminated by tubeless tires. The exclusive oil clutch operates for many hundreds of hours without adjustment. And in-cab starting, electric or gasoline, is standard.

Ask your Caterpillar Dealer for an on-the-job demonstration. He protects the long work life of the machines he sells with reliable parts and service.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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WANTED—THE HARD WORK

THE LATEST, MOST COMPLETE INFORMATION ON THE NEW HIGHWAY PROGRAM — FREE

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Dept. EE-8, Caterpillar Tractor Co.
Peoria, Ill.

Please send me immediately ..... copies of "The Road Ahead."

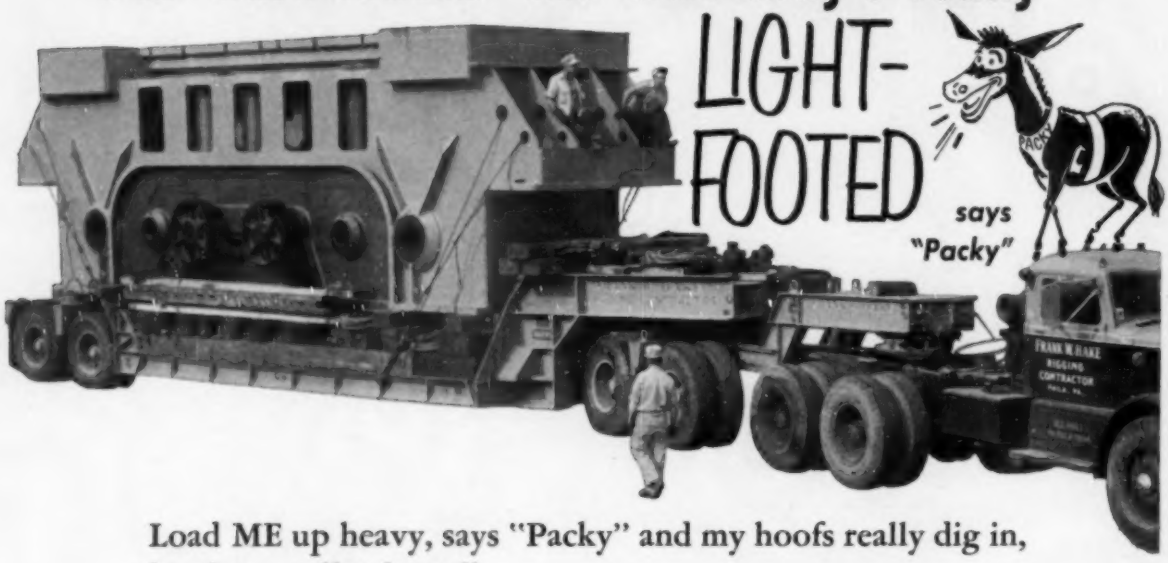
Name.....

Company.....

Address.....

City..... State.....

I'm "sure-footed" but that baby's really LIGHT-FOOTED says "Packy"



Load ME up heavy, says "Packy" and my hoofs really dig in, leaving a tell-tale trail.

Not so with this Rogers Trailer which transported 168 tons of press bed over the streets of Reading, Pa., without a "dimple" in the road surface. That's Light-Footed trailer performance with rigging and hauling skill on the part of the Hake Rigging Co., of Philadelphia, Pa.

Experience Builds 'em ROGERS Owners' Trailers Performance Sells 'em

ROGERS LOW BED – HEAVY DUTY **TRAILERS**

ROGERS BROS. CORP. ALBION, PENNA.

Export Office: 50 CHURCH ST., NEW YORK 7, N.Y.,U.S.A. *Cable Address:* Brosites

News . . .

Continued from page 42

worth Co., Boston, Mass. He is a native of Boston.

Allen was graduated from Phillips Academy, Andover, Mass., and attended Harvard University, Cambridge, Mass., where he was also one of the first to be enrolled in the special executives' course offered by the School of Business Administration.

Concrete Warning Issued

Contractors who pour concrete in Canada in regions where temperatures dip below freezing for long periods were warned of disastrous concrete failures unless specifications take protective recommendations into consideration.

J. John Racey of Montreal, Que., executive vice president and consulting engineer of the firm of Racey, MacCallum and Associates, issued the warning at the recent convention of the American Society of Civil Engineers at Buffalo, N. Y. He said that "disregard for minimum requirements of frost protection during winter concreting operations often result in immediate destruction or permanent weakening of the concrete.

"The wise designer will insist on a careful investigation of soil conditions being made before design of a structure is commenced," Racey said. "In Canada, as in many northern states, an ever-increasing volume of construction is being done in regions where the temperature drops far below the freezing point for days and weeks and, in some areas, for months on end.

Corps' Miller Honored

Garner W. Miller, chief engineering assistant, U. S. Army Engineer District, Memphis, Tenn., has been presented the highest civilian employee performance rating of the Department of Defense and a cash award of $300 for "superior performance of assigned duties." The rating, termed "outstanding" was presented to Miller by Maj. Gen. Charles G. Holle, special assistant to the Chief of Army Engineers.

Gen. Holle pointed up the many years that Miller has served in the Memphis district in executive, engineering and operational capacities and his exceptional abilities in handling difficult problems involved in the execution of the giant flood-control program of the Lower Mississippi River and tributaries project.

Equipment You Ought to Know About

Detachable Gooseneck Trailer

Manufacturer: Rogers Brothers Corp., Albion, Pa.

Claims: Rogers Brothers has introduced a new detachable gooseneck trailer which is exceptionally light and versatile.

The gooseneck mounts a hydraulic ram with a foot through which power is exerted to raise and lower the frame for detachment of the gooseneck and for the performance of other unusual operations. Power is supplied by a pump operated by a power take-off or in trailers of smaller capacity by an electric motor powered by the truck battery.

The operator faces the trailer as he handles all movements by means of a control lever on the gooseneck. Many steps are saved.

In addition to being capable of exceptionally fast detachment and reattachment which speeds up loading and unloading, the foot in contact with the ground makes possible new desirable operations. The trailer can move with the front of the frame above the normal position to aid in clearing high-banked railroad crossings. With the frame below the usual traveling position, additional clearance can be provided to pass high loads under overhead obstructions that would otherwise require detouring or unloading and reloading.

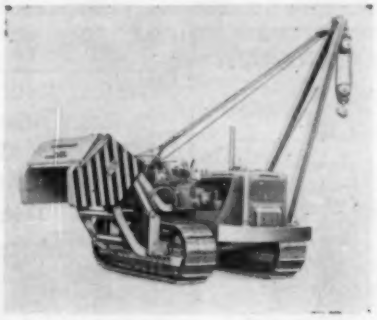
With the frame raised, blocking can be inserted under it to provide a fulcrum for raising the rear end of the trailer for easy changing of tires. Even with a load on the trailer, it is possible to utilize the foot to lift the rear of the trailer to change tires, if necessary.

Overhang loads can be handled speedily by raising the trailer deck to permit insertion of blocking, then lowering the deck and withdrawing all of the trailer with the exception of the gooseneck. The new trailers are available in a full range of capacities.

Medium-Sized Pipelayer

Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Claims: Availability of a new medium-sized pipelayer, designed to combine lifting power with sure stability, has been announced by Caterpillar.



Designated the No. 572 pipelayer, the new machine offers contractors 86,000 pounds of lifting capacity at 4-ft. overhang, and a wide 86-in. track gauge for dependable footing. Ground clearance of 19 inches assures maximum maneuverability in all types of terrain.

To withstand the extreme stresses of heavy pipelayer work, the machine's design includes the integrated unit construction of the tractor chassis and pipelayer mechanism. Further weight carrying ability is provided by the extra heavy-duty track rollers—six on each side—having large diameter bearings and shafts. A large sprocket, designed especially for pipelayer work, has also been incorporated. Hydraulic track adjusters permit quick adjustment of track tension with a standard grease gun.

Power for the No. 572 pipelayer is developed by a 4-cylinder Cat diesel engine, rated at 128 hp at 1,200 rpm. The engine transmits power to a three-stage torque converter, which is coupled with a special low-speed transmission having three forward and two reverse speeds.

In-seat starting is provided on the pipelayer, utilizing an independent two-cylinder, four-stroke cycle gasoline engine, with 6-volt electric starter.

"Him awfully big snake . . . maybe twins!"

The design of the No. 572 supplies constant full power to the boom and load lines whenever the engine is running. Power for the pipelayer winches comes from a live-shaft, constant power take-off direct from the engine, independent of the torque converter and flywheel clutch. The pipelayer winch has its own clutch and transmission.

The pipelayer winches have 22 x 5-in. contracting band, self-energizing brakes which are protected from the weather. The bands are interchangeable.

The boom drum has eight ratchet teeth, which can be engaged by a pawl to prevent accidental dropping of the boom. An interlock with the transmission of the winch prevents power lowering of the boom when the pawl is engaged. As an additional safety feature, the boom brake is spring loaded, and requires an over-riding effort against the spring to release.

A feature designed to minimize damage to the boom and cables is the automatic boom kickout, which releases the power-take-off clutch as the boom reaches its maximum vertical position. This kickout may be over-ridden for easy re-engagement of the power take-off clutch.

The counterweight design is also entirely new. For maximum stability under load, the weights extend in line, but

Continued on page 51

Contractors School

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Learn how to figure labor, material costs on construction jobs. Write for 30 day free trial. CONTRACTOR'S SCHOOL, Box 12, Dallas, Tex.

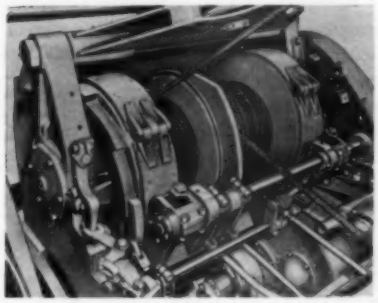
THE CASE OF
THE SLIPPING MAINTENANCE PROGRAM
BILL, THAT MOTOR GRADER CLUTCH SHOULD BE ADJUSTED—
I KNOW, BUT I'M MUCH TOO BUSY! OURS IS A BIG OPERATION, YOU KNOW.
CAN WE HELP? WE COULD HANDLE YOUR MAJOR RECONDITIONING JOBS, THEN YOU'LL HAVE MORE TIME FOR MAINTENANCE. WHY NOT TALK TO THE BOSS?
CAT
—AND WE HAVE SPECIALIZED REPAIR BAYS WHERE WE CAN REALLY DO A COMPLETE JOB! DO IT QUICK, TOO.
LET'S GIVE IT A TRY. WE'LL SEND OUR BIG REPAIRS IN TO YOU CHAPS!
SOME DAYS LATER
THERE! THIS ONE'S READY TO ROLL AGAIN. WE'RE CERTAINLY KEEPING AHEAD OF MAINTENANCE AROUND HERE THESE DAYS!
LET'S CHECK ON MACHINE NO. 17. THE OPERATOR REPORTED A LEAKY PUMP—
SOME WEEKS LATER
AND, MY MAINTENANCE PROGRAM IS DEFINITELY WORKING SINCE YOU TOOK OVER THE TIME-CONSUMING REPAIR WORK... WE ALSO HAVE FEWER MAJOR REPAIRS NOW.
GOOD! SAY, HOW ABOUT ATTENDING ONE OF OUR FUTURE CAT CARE SCHOOLS?
CATERPILLAR*
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.
CAT CARE FOR LONGER WEAR
LET ME HELP KEEP YOUR CAT* EQUIPMENT ON THE JOB!
Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

Continued from page 49

retract over the tracks for increased steering ease when the hook is not loaded. The hydraulically actuated counterweights respond quickly to balance the load safely and accurately. When the counterweights are fully retracted, no hydraulic pressure is necessary to keep them in position.

As the counterweights extend, they pivot outward from the base, which is mounted high on the track roller frame allowing clearance when passing through debris or other obstructions. After the weights have been partially extended, the effective mass rotates upward from a second pivot point high up in the rack. The second pivoting action is designed to give increased leverage so that the high lift capacity can be obtained with less counterweight.

The closed hydraulic system controlling the pipelayer mechanism includes the Caterpillar No. 46 hydraulic con-



trol and is designed to seal out dirt and abrasives, resulting in minimium maintenance problems.

The controls are located for the maximum possible convenience of the operator, and are positioned with respect to frequency of use. The boom line brake lever and boom line clutch lever are mounted on the same pedestal, as are the load line brake and clutch levers. Detents tell the operator when the "full-in" or "full-out" position has been reached.

The rear of the No. 572 pipelayer has been left clear to facilitate draw-bar work. Fifteen positions are available on the unit's swinging drawbar. This provides the needed versatility to work with any type of towed or rear-mounted equipment.

Koehring Truck Crane

Manufacturer: Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis.

Claims: Koehring is producing a 45-

ton capacity truck crane, the Koehring 445. The unit weighs 90,080 pounds which, for critical moving conditions, can be lowered to 67,100 pounds by removal of boom, counterweight and outrigger beams.

The 445 can use up to 120 feet of boom. Straight boom jibs, 15, 20, 25 and 30 feet long with cable are available. Safety boom limit stops and power boom lowering are standard equipment.

The truck is powered by a Waukesha 145GKB engine delivering 214 hp at 2,400 rpm. It has eight speeds forward —four in main and two in auxiliary. Top speed is 31.8 mph.

The truck chassis is mounted on a 220-in. wheel base. It is 10 feet 1 inch wide and 30 feet 2½ inches long. The 14.00 x 20—18-ply tires are carried on Budd heavy-duty 10-stud wheels. Two outrigger housings are furnished.

4-In. Wagon Drill

Manufacturer: Schramm Inc., 900 E. Virginia Ave., West Chester, Pa.

Claims: An improved wagon drill—larger, easier to use, and more powerful than previous models—has been announced by Schramm. It features long feed travel, a new down-pressure motor and line oiler and a full range of feed pressures.

The new model DR-126-A has many applications. In quarries, it can be used for primary drilling and toe holes; in highway and railroad construction, for blasting rock from right-of-way and making rip-rap and grout holes; in dam construction, for diversion channels, foundations and grout holes. Mounted on barges, it is used for underwater pier and caisson drilling. It is also used in open pit mining, and in drilling and blasting trenches for pipelines, sewers and utilities installations.

A standard Schramm 4-in. drifter is employed, with 10-ft. feed travel for 8-ft. steel changes—an improvement over the previous 8-ft. travel for 6-ft. steels. As a result, drilling time between changes is extended and delays are minimized.

In a Hayward, there's no contact between the closing mechanism and the gravel or other materials handled. To be sure—this "no contact" feature is only one advantage. But a very important one to you—since it means much less wear, reduced upkeep, and a significant dollar-saving in bucket maintenance.

The Hayward Company, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

SLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

Other improvements include a double-cylinder, seven-blade air motor. This high-torque motor runs evenly with 14 impulses per revolution. Supply air can be throttled for an infinite number of feed pressures. A new 2-gallon capacity line oiler is arranged so that a motor for the U-bar, or any other equipment, can be lubricated.

Crane Carriers

Manufacturer: Four Wheel Drive Auto Co., Clintonville, Wis.

Claims: A new line of Four Wheel Drive commercial carriers for crane-excavators has been introduced. The pri-

GET 59% MORE LIGHT OUTPUT...

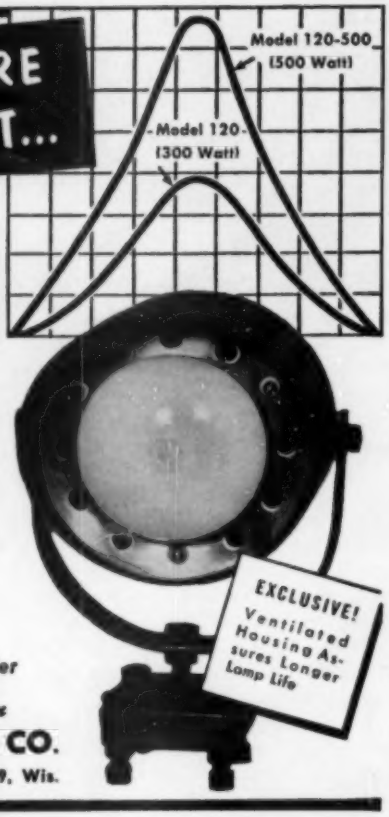
From Model 120 500 Watt

STURDILITE
FLOOD LAMP

- Steps up night-time production —
- Adds to SAFETY! . . .
- Especially Adapted for Operations Such as Open Pit Mining, Stripping, Dredging, Excavating, Crushing and Mix Plants, Logging, Road Building, Drilling, Quarrying, Etc.

WRITE For Illustrated Folder

Metal Spinning Division
PHOENIX PRODUCTS CO.
4723 N. 27th St. • Milwaukee 9, Wis.



mary FWD carrier is a 15-ton 6 x 4 model, but the FWD line also includes 25 and 30-ton carriers. The company will design other sizes to meet individual manufacturer requirements. FWD also is offering its heavy-duty axles for use in production of four-wheel-drive wagon cranes.

The commercial carriers are available with a wide range of engine and wheelbase options to meet the varying needs of crane, shovel, backhoe and dragline

models. Engine options include the 150-hp BD-308, 212-hp RD-501 and 216-hp 145GK gas engines, plus several diesel models in the same horsepower ranges.

Carrier construction features an all-steel one-man cab alongside the engine. The heat-treated channel steel frame is reinforced throughout for increased torsional strength, but its weight is held to a minimum to meet state regulations. Basic FWD carrier drive system is 6 x 4 with independent power to each of the two rear axles. The line also includes carriers with six-wheel-drive, featuring a patented power-proportioning center differential, for specific applications.

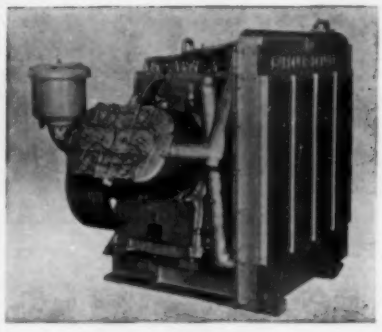
The FWD carriers have removable sliding outriggers, and are available with a five or 10-speed transmission in addition to engine and wheelbase options.

200-Hp Compressor

Manufacturer: Gardner-Denver Co., Quincy, Ill.

Claims: A new high-capacity unit has been added to the Gardner-Denver WB line of air compressors. The new model WBN is designed to save costly floor space. The 200-hp two-stage packaged unit occupies only 34 square feet of space. In many instances, this compressor is sufficient to permit retirement of two smaller compressors, with corresponding saving in space.

The WBN needs no special base. All that is required to put it into operation



is to bolt it down and hook it up to its source of power. Once installed, it operates on long, steady runs with little attention. The WBN is available with a tube-type intercooler or with a self-contained radiator-intercooler which saves on cooling water.

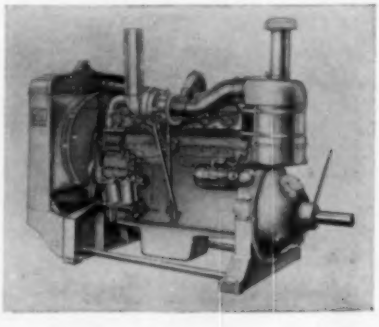
Turbocharged Power Unit

Manufacturer: International Harvester Co., Construction Equipment Div., 180 N. Michigan Ave., Chicago 1, Ill.

Claims: International Harvester has entered the turbocharged engine field with a new 250-hp Turbotorque UDT-1091 power unit.

This 250 brake horsepower rating is attained at 1,500 rpm, an increase of 50 hp over its naturally-aspirated counterpart, the UD-1091—previous top horsepower unit in the International line of 18 power units. The new 6-cylinder unit has all the dependable features of the UD-1091, plus the advantages inherent in its turbocharger components.

Its exhaust gas-driven, AiResearch turbocharger moves 60% air through the big 14-in diameter air cleaner. This tremendous boost in air supply to the



cylinders results in an economy-saving cut in fuel consumption and higher power with lower exhaust gas temperatures.

A water-cooled oil temperature stabilizer is standard equipment on the new

Continued on page 54

PIONEERS ROADWAYS

STRIPS BLACKTOP

How you can speed dozing jobs ...cut non-productive costs

To get a work combination that's ready for profitable *action* anywhere ... anytime... check the 210 hp LeTourneau-Westinghouse Tournatractor®. This rubber-tired tractor can drive job-to-job at a moment's notice. Operator just flips instant-shift lever and he's on his way — over highways or cross-country. Big, low-pressure tires do no damage to pavement, bridges, or RR tracks.

Handles wide variety of jobs

Equipped with bulldozer or Angledozer® blade, versatile Tournatractor does pioneering, ditching, backsloping... levels and maintains dumps and fills... strips blacktop... speeds through dozens of other clean-up and maintenance jobs. Also, Tournatractor's power and maneuverability make it an excellent pusher. And it can be used effectively as a pull-type scraper prime-mover. Use its speed and maneuverability, also, to pull Rooters, Sheep's Foot rollers, and other heavy equipment.

Simple, safe operation

With electric push-button controls grouped handily in front of operator, he can keep his eyes on the ground. And, sitting up front, operator can see where he's going, what he's doing — for sure, safe control at all times. Big, heavy-duty air brakes on all four wheels provide 940 square inches of braking surface on each wheel. That's more braking surface *per wheel* than most comparable units have *on the entire machine*. Operator can effectively use all of Tournatractor's speed and mobility with confidence and safety.

Costs less to maintain

With enclosed anti-friction drive and fewer moving parts, Tournatractor is better protected from wear — will give you higher efficiency through many more hard-working hours of continuous service.

Tournatractor has only 4 rubber-tired wheels compared to about 562 crawler track parts. In many materials, tires outwear tracks by as much as 2-to-1. In highly abrasive materials, tires give as much as 4 times more service than tracks. Also, with extensive oil enclosures, plus anti-friction bearings throughout, maintenance time is much less.

See Tournatractor in action

Why not investigate "work-and-run" Tournatractor's effectiveness for your projects? You'll be amazed at the speed and efficiency in which this rubber-tired tractor can handle scattered dozing and pusher assignments. We'll be glad to arrange a demonstration. Call or write for complete details. CT-1494-DC-1

HANDLES PRODUCTION DIRTMOVING

MAKES EMERGENCY ROAD REPAIRS

DRIVES JOB-TO-JOB

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

New Equipment . . .

Continued from page 52

unit. The radiator has been enlarged to increase cooling capacity.

The instantly available horsepower these features bring, together with an extra-large counterbalanced crankshaft and heavy flywheel, assure stall prevention at peak loads. The new unit's power rating is on-the-project horsepower, not the factory testing lab rating exclusive of loads such as fan, radiator, accessories, and altitude and air temperature differentiations.

A continuous duty rating of 200 hp, developed at 1,500 rpm, will enable users to obtain more production at lower costs.

Grease Gun

Manufacturer: K-P Mfg. Co., 1226 Linden Ave., Minneapolis, Minn.

Claims: An all-purpose grease gun gives either high-volume delivery or high-pressure performance by merely adjusting a fingertip control. Called the V. C. (Volumatic Cartridge) gun, it has an adjustable nut whose setting instantly controls the range of performance from high volume as desired to high pressure for tight fittings.

Other features of the V. C. gun include a swivel spout designed to make out-of-the-way fittings easy to reach; a floating sleeve with a lip for smoothing out dented cartridges; and a special leak-proof plunger, high tension spring and safety lock plunger rod. The head of the gun is tapped with a ⅛-in. P. T. to accommodate a loader valve.

Bulk grease may be used in the gun by leaving an empty cartridge in the barrel and then loading in the same manner as a conventional gun. The same gun may be obtained without the cartridge-loading feature.

CONTRACT DRILLING

Specializing in Quarry Blast Holes
using
Ingersoll-Rand Drillmasters

NEW JERSEY DRILLING CO., INC.
Box 431, Madison, N. J. FRontier 7-5996

Sherman Power Digger

Manufacturer: Sherman Products, Inc., Royal Oak, Mich.

Claims: A completely new power digger for mounting on Ford tractors has been introduced by Sherman. The unit —the F Model—supersedes earlier Sherman models for the smaller Ford tractors.

The new unit has a breakaway capacity of 9,000 pounds. A new hydraulic system, compact in design to permit short lines, contributes to power and speed. The hydraulic system pressure is 2,000 psi. Another contributing factor

is the pump driver from the tractor PTO at the rear, which through a Sherman planetary Step-Up transmission develops digging speed.

The "F" can excavate a trench 15 feet 8 inches long from one tractor position. The arc of swing is 188°; reach below grade, 12 feet; and the loading height, 9 feet 2 inches.

The shovel has tapered sides. Its two-position linkage permits quick adjustment for deeper straight wall excavating or high loading.

The hydraulic stabilizers are of a new design. Individually controlled, they have a spread of eight feet and give both lateral and angular support for maximum stability on sloping and uneven ground. They fold to less than tractor width for transporting. A large diagonal spade and web with a 12 x 14-in. plate assures wide contact.

The unitized operator's seat and control panel provides comfort and unrestricted visibility. The seat is adjustable for various arm and leg lengths.

The digger can be dismounted from the tractor or mounted by removing or replacing six pins and four bolts.

Main and swing frames are of heavy-duty steel plate, weldment construction; the sub-frame is full length, box construction. The crowd cylinder operates within the box-construction boom.

Twin, single-acting swing cylinders are coupled to the swing sheave by heavy roller chain. The swing is regulated by a combination flow control and cushioning valve.

The dipstick also is of reinforced "stress-design," box construction. An actuating cylinder and the geometry of linkage provide maximum tooth pressure.

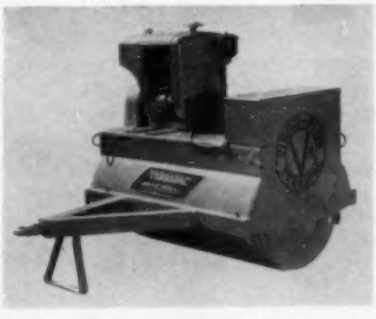
The Sherman unit's hydraulic reservoir is oversized for maximum oil cooling. A full-flow, re-usable filter in the reservoir purifies the oil before it reaches the pump.

Reach at grade from shovel teeth to the tire at 90° to the tractor is 12 feet 2½ inches; reach from the axle at grade is 18 feet; from the rear axle to the center line of the swing post, 38 inches. The loaded shovel clearance height is 9 feet 2 inches. The shovel teeth clearance height fully dumped is 12 feet 6 inches.

Soil Compactor

Manufacturer: Vibro-Plus Products, Inc., Stanhope, N. J.

Claims: Vibro-Plus has announced a new vibratory soil compactor as a companion to its Terrapac models CH 30 and CM 20. The new model CK 10 was developed to provide contractors with a low-cost soil compactor which still retains high production capacity. Weighing only 1½ tons, it produces a 5-ton impact due to a unique combination of vibratory frequency (2,400 vi-



brations per minute) and high amplitude. Lower vibration frequencies mean less wear and tear on the unit, sharply reducing maintenance problems. Heavy-duty, dustproof bearings insure the contractor against maintenance problems arising in the field. Special shock absorbers isolate the drum from the frame so

Continued on page 56

Major copper mine in Arizona

helps boost production with 2 heavy-duty graders

Building railroad bed, Adams 660 works dumped waste material to edge of bank for casting overside with bulldozer blade.

Said one grader operator, "The Adams is much faster . . . will do twice as much work. Controls are easier, blade visibility better."

At a large open-pit mine in Arizona, ore is mined at low levels and hauled by railroad cars . . . at higher levels, overburden is removed by a fleet of 35-ton trucks. To help these haulers travel at safe, profitable speeds, and to speed road and rail-spur construction — the mine uses two 150 hp Adams* 660 graders.

Patrols roads 24 hrs. a day, 6 days per week

One of the heavy-duty "660" LeTourneau-Westinghouse units is used primarily for maintaining many miles of haul roads. This fast-moving grader patrols these busy mine roads 24 hours a day, 6 days a week. It goes wherever needed . . . to fill ruts, level washboard, clear debris dropped by overloaded haulers and improve drainage.

For working along steep drop-offs, the Adams' standard blade extends a full 7½ ft. beyond wheel line, to give operator safe working margin. Extra-safe dual-braking system stops transmission as well as tandem drive-wheels for sure, safe stops and minimum brake wear.

Helps build new roads, RR grades

The second "660" grader — equipped with bulldozer blade — is used on new construction work and for maintaining waste dump. When constructing new roads or railroad beds, the "660" handles all the blade work.

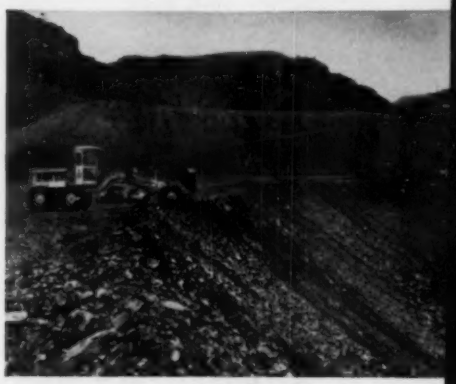
Works any kind of material

Wide range of speeds give Adams advantage for working efficiently in any kind of material. All 80 to 150 hp Adams graders have an 8 forward and 4 reverse speed transmission. In addition, optional 3-speed "creeper" gears (0.23 to 1.82 mph) may be added. These low, full-power speeds move heavier loads, handle rocky material with greater speed and safety, insure more accurate blade control for fine finishing around forms or obstructions.

Adams' largest grader — the powerful 190 hp POWER-*Flow* 660, with torque converter — gives you an infinite number of speeds forward to 27.4 mph . . . reverse to 24.4 mph. Adams' smallest, the 60 hp "220", has 5 speeds forward to 18.3 mph — best in its class.

See Adams in action

Why not see how you, too, can step up mine and quarry production, cut operating costs — with heavy-duty Adams graders? There are 6 models: 190, 150, 123, 115, 80, 60 hp. Choice of GM or Cummins engines on 5 larger models. Call or write for a demonstration at your pit.



With dozer blade, "660" maintains waste dump. Over 72% of the total amount of material mined at this copper mine is waste.

Powerful "660" helps build exploration roads and RR road beds fast and easy. Commenting on the Adams grader, the second operator said, "I like the power and weight of the '660'. Also, the big 14-ft. moldboard and wide choice of speeds."

*Trademark G-1483-M-1

LeTourneau-**WESTINGHOUSE** Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

You can't set your sights too high

For digging . . . for handling material . . . for any clamshell work — OWEN Buckets perform giant size jobs day in and day out. OWEN'S designing and engineering experience, gained through 50 years of manufacturing Clamshell Buckets exclusively, has developed a product that is guaranteed to out-perform any other make. Remember—the bucket is the working end of the boom and it is of the utmost importance that there is absolute assurance the bucket will do the job.

This experienced "know-how" in design and engineering has contributed to the origination of the only independent tine action Grapple to handle rock, scrap metal or pulpwood. The same unequaled quality construction in OWEN Clamshell Buckets is in OWEN Grapples.

OWEN Engineers are at your service any time at no cost to you. Send us your needs, stating exactly what are your requirements. We should have the answer that will "fit the bill to a T".

The OWEN BUCKET Co.

BREAKWATER AVENUE, CLEVELAND 2, OHIO

BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

New Equipment . . .

Continued from page 54

that no destructive vibration is transmitted to the gasoline engine or battery.

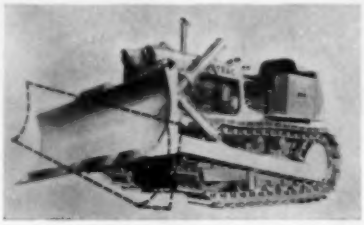
The CK 10 is highly maneuverable. It may be towed by small rubber-tired tractors to within 1½ inches of walls and abutments. A twin scraper bar keeps the drum clean when rolling forward or backward.

Case "Tilt" Dozer Blade

Manufacturer: J. I. Case Co., Racine, Wis.

Claims: J. I. Case has developed a "Tilt-Crown" bulldozer blade which can be tilted 14 inches to either side and tipped 10° fore or aft by hydraulic power—all from the operator's seat. The new feature is said to offer special advantages for, among other things, ditching, road crowning, cutting tree roots and breaking out hard ground.

The blade is activated by four large hydraulic cylinders. Two cylinders mounted on the dozer push arms control



tilt and tip. The other two cylinders, trunnion-mounted on the tractor, exert down pressure with the blade in any position and also lift the blade 34 inches from ground level.

The center-pivot mounting is said to make possible tilting of the moldboard without twisting tractor or track frame.

The power-tilt feature is available on the new 80 and 100-hp Case-TerraTrac crawlers equipped with torque converter drive, power-shift hydraulic transmission and the Case counter-rotating power steer.

Here's tandem push-power in one easy-to-spot machine handled by one operator

Big E Tournapull, with 27-yd. Fullpak* scraper, picks up heaping load *fast* with Twin-C pushing. New tandem-engine pusher provides enormous power, plus speed to match rubber-tired scrapers. Owner benefits from economies of one-machine operation.

Big push-plate of Twin-C is raised and lowered by electric control. Operator can center plate on scraper push-block, to assure solid contact at all times. Once push starts, plate "floats"... automatically adjusts to match movements of scraper push-block.

Since the trend in earthmoving today is to bigger-yardage contracts, you are using more and more of the larger-size scrapers... machines of 18 to 27-cu. yd. capacity. To push-load these giants efficiently, contractors are finding it necessary to double-head their crawler pushers.

While this practice produces extra drawbar pull, it seldom proves practical. First, there is the problem of synchronizing the actions of 2 operators and 2 machines. Time is lost in positioning, and tandem crawler teams cannot effectively match the speed of rubber-tired scrapers. Finally, there's the added expense of operating the extra machine, with its extra operator.

LeTourneau-Westinghouse, alone in the earthmoving field, offers a unit that solves these problems. The job-proved Twin-C* pusher provides: a) synchronized tandem push-power, b) a speed range to match rubber-tired scrapers, c) single-unit ease in positioning, and, d) economy of one-machine, one-man operation.

Proven drawbar pull of up to 64,500 lbs.

Twin-C provides the combined horsepower output of two 210 hp GM diesels on one machine. With its 40 tons of tractive weight, its tires over 7′ high and 2½′ wide, this machine develops 64,500 lbs. of drawbar pull.

Consider, also, Twin-C's many additional advantages, besides its tandem power (a "first" in the rubber-tired pusher class). This pusher can develop speeds up to 20 mph forward, 5.8 in reverse. Air brakes on all 4 wheels provide 3,690 sq. in. of braking surface, for quick stops and fast maneuvering.

Positive, Tournapull®-type steer

There's new steering ease, too, with the Twin-C. Operator can make 90° turns in tight quarters, because positive power-steer is applied through geared kingpin at base of yoke. It's the proven LeTourneau-Westinghouse steering principle used successfully on Tournapull-Scrapers all over the world. Front and rear sections line up automatically when steering power is shut off.

Power-lift on push-plate

Twin-C's big, electric-controlled push-plate is easily raised or lowered by operator to make on-center connection with every push-block. Once push starts, plate "floats"... automatically keeps contact with scraper until bowl is filled.

If tandem pushing is becoming the accepted practice on your spreads, find out more about the new Twin-C. Call or write for full specifications on this powerful pusher.

*Trademark TW-1133-DC-1

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

Let One Bucyrus-Erie Do Double-Duty Drilling

You can keep profits flowing the year 'round with Bucyrus-Erie 20-W and 22-W cable tool drills because they offer you two ways to make money: (1) drilling small blast holes and (2) drilling water wells.

With direct drive from jackshaft to spudding gear these rigs put down 4- to 8-in. blast holes at low per-foot cost. Both machines combine easy mobility and snappy drilling action with plenty of spooling capacity for the generally deeper water wells. All-steel welded construction assures low maintenance.

Either way, the 20-W and 22-W provide outstanding performance . . . keep your work moving at a steady clip, even on widely scattered jobs. Write for more information today.

99W57

BUCYRUS ERIE South Milwaukee, Wis.

Dolomite . . .

Continued from page 27

Steel's Pittsburgh Steamship Div. and Bradley Transportation Line carry a large share of the limestone shipments.

Flux, special flux and open hearth rice represent about 70% of the Port Dolomite cargoes. The remaining 30% of the production is aggregates and fine stone.

Port Dolomite's fast loading time is made possible by an efficient shuttle-type loader. Riding on rails laid parallel to the high conveyor on the dock, the loader shuttles back and forth to any desired point on the dock while the ship remains stationary.

As the high 54-in. conveyor brings stone up at the rate of 2,800 net tons per hour, a traveling "tripper" which is rail-mounted on the conveyor frame diverts the flow of stone from the belt onto a mechanical loader equipped with 60-in. conveyors. The loader dumps it into the hatches of the ship.

Michigan Limestone runs the entire quarry, railroad, plant and dock operations with about 135 employees.

The plant and railroad operate one shift a day from 6 a.m. to 2 p.m. The quarry runs on a double-shift basis from 6 to 2 and 2 to 10. This arrangement works out smoothly because the quarry and plant surge pile facilities maintain an ample flow of materials to the plant at all times.

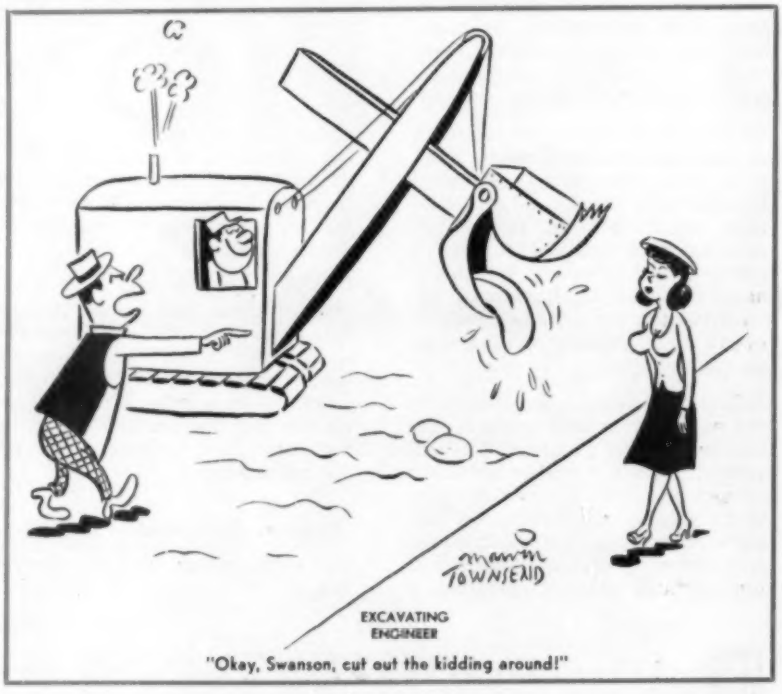
Maintenance at the plant is performed from 2 to 10 p.m. when operation is shut down. At the quarry, maintenance on equipment is done between shifts and after the last shift. A combination garage-maintenance building at the quarry site handles light servicing of vehicles and small pieces of equipment. Heavy maintenance of trucks is handled at the Calcite quarry near Rogers City during winter months.

Personnel

C. A. Pratt is Cedarville plant manager; he is assisted by L. M. Irvin. The list of supervisors includes G. E. Burns, mill foreman; E. E. Bruning, quarry foreman; S. Keller, electrical foreman; L. G. Macklem, maintenance foreman; E. C. Schaedig, yard foreman; T. G. Rose and L. E. Nye, loading and repair leaders; and I. T. Bannon, dock office supervisor and storekeeper.

C. F. Beukema is president of Michigan Limestone Div. L. J. Patterson is manager of the Northern District in which the Cedarville and Calcite quarries are located.

Besides the Michigan quarries, the division operates two mines and a quarry in Pennsylvania and a quarry in West Virginia. Vanport limestone is mined at Annandale and Kaylor, Pa.; and quarried at Hillsville, Pa. Dolomite limestone is quarried at Moler, W. Va. The division also operates the Bradley Transportation Line, a fleet of nine self-unloader vessels, as well as two agricultural grinding plants located at Buffalo, N. Y., and Conneaut, Ohio.



"Okay, Swanson, cut out the kidding around!"

On Brazilian dam project:

Loaders unable to match Rear-Dump speed, capacity

"Before putting our 3 C Rear-Dumps to work, we had trouble finding haulers capable of carrying enough rock and dirt. Now we have trouble supplying enough material to keep these 3 machines busy."

That is what impresses Fabio Paiva Garcia, project superintendent, about the performance of the 3 LeTourneau-Westinghouse haul units working at Santa Branca, Brazil. There his firm, Cavalcanti & Junqueira S.A. of Sao Paulo, is excavating 2,620,000 cu. yds. of rock and earth to prepare structures for a new hydro-electric dam on the Paraiba river. Sao Paulo Light & Power Company awarded the contract.

Rear-Dumps haul from muddy pit

To handle the earthmoving, Mr. Garcia is using three C Tournapulls equipped with 22-ton Rear-Dumps, and three C Tournapulls with scrapers. Two 1.5-yd. power shovels load the haulers. On a typical work cycle of 1,728 ft., the 3 Rear-Dumps were loaded with 10.5 yards of rock and earth. The Tournapulls' front-wheel drive, power-transfer differential, and positive kingpin power-steer easily maneuvered capacity loads out of the muddy pit.

Climbed 11% grade to road

After being loaded in about 2 minutes, the C Rear-Dumps climbed an 11% grade to reach the haul road. Time for each 820 ft. trip to the fill averaged 2 minutes. Loads were dumped in 15 seconds along the banks of the Paraiba river. Total cycle time, including return from fill to pit, averaged 8 minutes, 45 seconds. Footing was slippery.

No maintenance in 300 hrs.

The contractor is working his equipment 20 hours a day, 7 days a week. In their first 300 hours of operation, the 3 Rear-Dumps required no repairs, Mr. Garcia reported, and lubrication was quick and easy.

Owner Gilberto Alves Ferreira says, "These are very good machines. We are well pleased." Operator Jose Anselmo adds, "They are very maneuverable where sharp turns are necessary. Furthermore, they are easy to lubricate."

Rear-Dump units for the Tournapull prime-movers were manufactured by Tratores do Brasil, S.A., subsidiary of LeTourneau-Westinghouse Company.

You can save time and money, too, on *your* heavy-duty hauling jobs, with the LeTourneau-Westinghouse C Rear-Dump. Write for details.

Tournapull—Trademark Reg. U.S. Pat. Off. CRCP-1370-D-b

One of the 3 C Rear-Dumps owned by the Sao Paulo firm dumps 10.5-yard load in 15 sec. on bank along Paraiba river. To prepare structures for the new dam, 2,620,000 cu. yds. of rock and dirt had to be moved.

On muddy pit floor, 22-ton C Rear-Dump is loaded quickly by a 1.5 yard shovel. Rear-Dumps are owned by Cavalcanti & Junqueira S/A, excavating for a new dam on the Paraiba river in Sao Paulo province, Brazil.

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

On the Mesabi Range . . . And The World Over

BIG OUTPUT BUCYRUS MATCH LARGE-VOLUME

ERIES
NEED IN TACONITE

This Bucyrus-Erie 190-B shovel is loading taconite into ore cars 8 cubic yards at a bite — hundreds of tons every hour. In operations such as this, requiring continuous and economical handling of big yardages of tough materials, the design advantages of Bucyrus-Erie Ward Leonard electric excavators become more important than ever:

Modern front-end combines great strength with light weight to boost payload ratio.

Heavy-duty construction throughout keeps the shovel working, holds down maintenance, assures long service life.

Ward Leonard variable-voltage control permits fast acceleration and deceleration, provides extra torque when needed for fast work cycles.

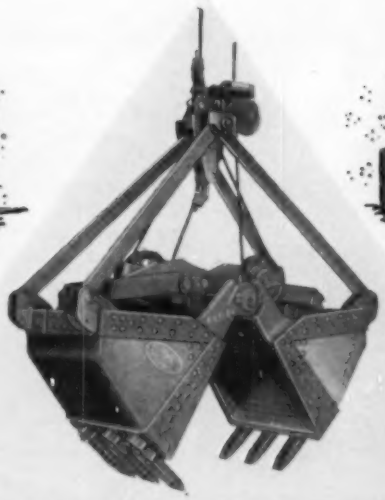
Performance features such as these are just a few of the many reasons why more ore is mined on the Mesabi range with Bucyrus-Erie electric shovels than with any other make. It will pay you to investigate these master miners for your own big-yardage operations.

126L57C

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

YESTERDAY



TODAY

BUCKETS CHANGE TOO

KIESLER LEADS WITH THE MIGHTY Ice Mighty Tong Principle THE WAY . . . ICE TONG PRINCIPLE!

There's no doubt about it: whether you are excavating, rehandling coal, sand, crushed stone, or slag, you want a bucket that DIGS DEEP AND DUMPS FAST! And for THE bucket that DIGS DEEPEST and DUMPS FASTER — AT NO ADDITIONAL COST — the name is KIESLER!!

The reasons for that PROVEN claim are these: the exclusive shell design of all KIESLER buckets . . . while designed to hold the greatest loads . . . gives a sharper dumping angle so that dumping begins the instant that the jaws start to open (not only when they are wide open). This affords the operator spot dumping . . . avoids spillage . . . and thus . . . reduces handling costs to a minimum.

Equally important, KIESLER buckets — and only KIESLER applies the age-old principle of leverage through BOTH lever arms. Thus power is applied EQUALLY to BOTH shells . . . without unnecessary parts to the line, with less cable, without extra dead weight.

The results: a bucket that DIGS DEEPER and DUMPS FASTER . . . a bucket that will still be in operation after other buckets are junked.

GUARANTEE · Kiesler Buckets are guaranteed to outperform and do a bigger day's work than any other Bucket of equal weight, width and size, when properly reeved and operated.

JOS. F. KIESLER Co. Since 1892

944 W. HURON ST. • CHICAGO 22, ILL. • MOnroe 6-7144

Seaway . . .

Continued from page 31

will affect 225 farm families and 500 cottage owners on the American side.

The pool will range in width from one to four miles. Dikes totaling about 21 miles in length and rising to a maximum height of 85 feet will retain the pool.

The Milwaukeeans did not have time to visit the Massena Intake, a major Power installation under construction. The intake will regulate the flow of water into the Massena Power Canal, maintaining a domestic and industrial water supply for Massena and the Aluminum Company of America plant.

Leaving Massena, the tour buses followed the highway along the river, where draglines, shovels, bulldozers and dredges working on channel improvement contracts supplied further proof of the great changes the projects were effecting. Close to 50 million yards will be excavated from the channel between Cornwall and Ogdensburg, N. Y. This excavation will provide proper depth and control water velocity for the Seaway and will conserve the power head and allow efficient winter operation of the power dam.

View Iroquois Dam

Last stop for the group was at Iroquois, where it watched second half construction of the Iroquois Dam. The Dam, whose 32 spillway sections are spaced over 1,980 feet, will control and regulate Lake Ontario's outfall. The dam replaces a natural control which will be removed from the river for navigation purposes. Excavation for Iroquois Dam will total about 4½ million yards. Some 170,000 cubic yards of concrete will be placed.

Opposite the dam, on the Canadian side, is the Iroquois lock, the last lock before the Welland canal. The lock will permit ships to by-pass the control dam. Its maximum lift will be six feet. Most of the construction work on the lock, involving excavation of 4½ million yards and the placement of 330,000 yards of concrete, will be completed by autumn.

Having seen one of the outstanding construction undertakings of all time, the Milwaukeeans talked about it over a steak at the exclusive Thousand Island Club, on an island in the St. Lawrence, then flew back to Milwaukee.

They had quite a story to tell their friends and associates.

New Trade Literature

Subject: **Payhauler Trucks**

Content: An eight-page folder describes International Payhauler off-highway trucks. It contains on-the-job reports and numerous photos of the 24-ton model 95 and the 18-ton model 65 on road, quarrying and mining operations. Ask for booklet CR-592-G. Also available is a rating chart for the International line of 17 engines and power units. The chart offers brake horsepower on engines without fan or accessories, and on power units with fan and accessories. Horsepower ratings are corrected to standard conditions at sea level and 60° F. Ratings are given on all fuels which can be used in the carbureted units. A separate page lists the extensive number of typical applications possible for the units. Ask for CR-522-G.

Where to get: International Harvester Co., Construction Equipment Div., 180 N. Michigan Ave., Chicago 1, Ill.

Subject: **Blasting Hazards**

Content: A report approved by the Institute of Makers of Explosives discusses the hazards of radio-frequency energy to blasting operations. The booklet, *Radio Frequency Energy—A Potential Hazard in the Use and Transportation of Electric Blasting Caps*, replaces an earlier Institute approved publication on the subject and points out that the possibility of a premature explosion due to RF energy is extremely remote. It explains in simple terms the nature of this type of hazard and offers precautions designed to minimize it. Two tables of recommended distances are presented for the guidance of persons performing electric blasting operations in the vicinity of fixed or mobile AM and FM transmitters. Since many explosives users — especially contractors — operate mobile FM equipment, it is interesting to note that the minimum distance recommended in the pamphlet for conducting electric blasting operations is only 30 feet from a 250-watt FM transmitter; 5 feet from a 10-watt FM transmitter. The 9-page booklet also describes in detail how to determine the extent of the RF energy hazard in any area. The potential hazard of such types of RF energy sources as microwave relay, radar and Loran are also analyzed. Ask for pamphlet No. 20.

Where to get: Explosives Development Section, Atlas Powder Co., Wilmington 99, Del.

Subject: **Auger Drill Parts**

Content: A new parts bulletin lists drilling augers, heads, bits and other accessory parts for the McCarthy line of coal recovery, horizontal and vertical auger drills. Various size attachments equip the drills to bore holes from 3 to 48 inches. This new bulletin supplements bulletins 100, 101, 102 and 105, describing McCarthy auger drills. Ask for bulletin 11156.

Where to get: Salem Tool Co., Salem, Ohio.

Subject: **A-C Tractor**

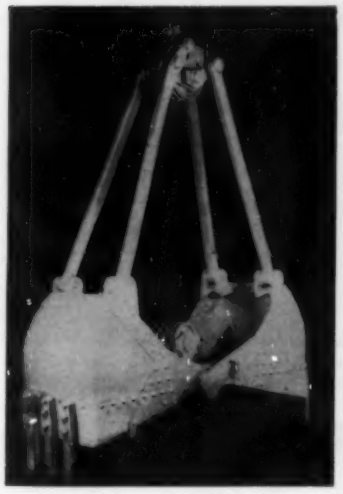
Content: A new fold-out specification sheet discusses the Allis-Chalmers HD-16 diesel-powered crawler tractor. It features a cutaway view of the tractor that shows both the gear-type and the hydraulic torque converter drive transmissions, and many of the mechanical, design and construction highlights of the HD-16. The torque converter drive, which Allis-Chalmers introduced into the crawler tractor field in 1940, is also reviewed along with its advantages. Ask for bulletin MS-1192.

Where to get: Construction Machinery Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Subject: **Conveyor Belts**

Content: A new catalog covering conveyor and elevator belts has been issued by Raybestos-Manhattan. It covers new style designations of general service heavy-duty types of conveyor belts made with special strength members, gives tension ratings for vulcanized and metal splices, minimum recommended pulley diameters and minimum belt width for good troughing. Also included is a complete line of hot material belts for temperatures from 150° to 350° F. Ask for catalog 25 CB.

Where to get: Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.



FREE BULLETIN 757
contains complete information on Hutton Pelican production Clam Shell Buckets.

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CLAM SHELL BUCKETS

There's a bucket you can get called Pelican
Whose bowl holds more than any other can
It takes in a bite all the stuff in sight
And you wonder how in the helican!

FASTEST-OPERATING, EASIEST HANDLING BUCKET we have ever used, report many operators.

NEW T-1 FORGED STEEL TEETH AND LIPS—a revolutionary new steel that minimizes bucket downtime.

WELDED CONSTRUCTION—for perfect alignment.

BLOCK AND TACKLE TYPE REEVING—for trouble-free operation.

INTERCHANGEABLE PARTS—on five different sizes.

Write, wire or phone for prompt delivery.

HUTTON FABRICATING MFG. CORP.

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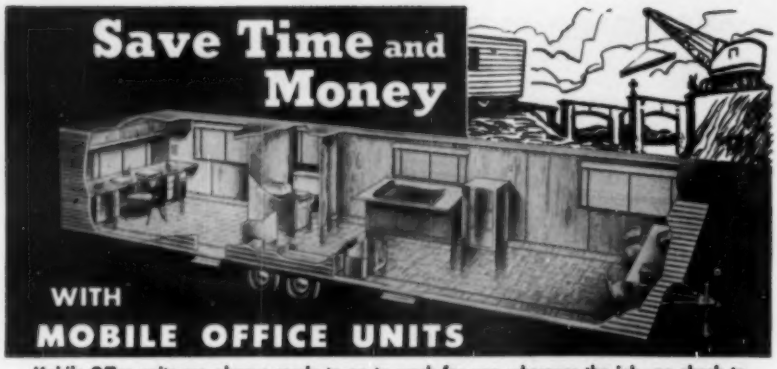

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Notes from the Manufacturers

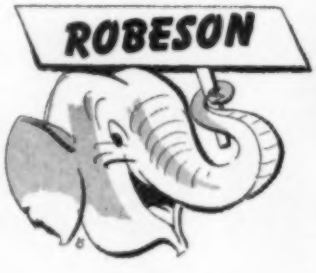
Bucyrus-Erie Co., of Canada, Ltd., has begun excavator production at its new plant in Guelph, Ont. The excavator model now being manufactured is a ¾-cu. yd. crawler. While the first machines have been largely fabricated from component parts supplied by the parent organization's plant at Erie, Pa., the product will be largely Canadian in content within the next few months. This will be accomplished both by an increase in the manufacturing operations of the Guelph plant and by the development of sub-contracting operations. The plant is scheduled for official opening in September. About 150 persons will be employed. James I. Carmichael is president of the Canadian company. George Read is sales manager, with offices in Toronto, Ont.

Caterpillar Tractor Co., Peoria, Ill., has appointed John E. Pilon district representative in its southwest sales division. He will work out of the firm's San Francisco (Calif.) office and serve dealers in Marysville, Sacramento and Colusa, Calif., and Salt Lake City, Utah, and Reno, Nev. Herbert J. Benzel has been appointed earthmoving representative in the Plains sales division and will service dealers and customers in Montana, Wyoming and North and South Dakota. He will work out of Billings, Mont.

Jay Co., Columbus, Ohio, has appointed Jack Jergens field manager in the central states. Jergens joined the company a year ago as assistant field representative in the western division. His territory will take in North and South Dakota, Kansas, Missouri, Iowa and Minnesota. He will make his home and headquarters in Kansas City, Mo.

LeTourneau-Westinghouse Co., Peoria, Ill., has appointed G-K Machinery Co., 5200 Federal Way, Boise, Idaho, as a distributor for the complete line of LeTourneau-Westinghouse and Adams products in southern Idaho and eastern Oregon.

White Motor Co., Cleveland Ohio, has purchased the assets of Reo Motors, Inc., of Lansing, Mich., from the Bohn Aluminum & Brass Corp., Detroit, Mich., for an undisclosed amount of cash. Robert F. Black, chairman of the board and White's chief executive officer, said that the acquisition of Reo was a step in White's expansion program.



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The PRIMER gives excellent rust-resistance, is fast-drying (30-40 min.) and forms an excellent surface for applying the Enamel. It is abrasion-resistant. Can also be used on Marine and floating equipment.

The ENAMEL is grease and oil resistant, gives high coverage and excellent color retention. Can be applied with brush or spray gun. 12 high gloss colors. Only one Primer and one Enamel coat usually needed.

Why not learn TODAY how these, and other, Robeson Products can save YOU time, money and equipment by writing

Also manufacturers of ROBESON PRESERVO, the easily applied liquid which makes tarps water, weather and mildew resistant and doubles the life of canvas.

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Quality Products For 60 Years

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Bucyrus-Erie 200-W diesel dragline shipped in 1950; 125 ft. boom, 6 yd. heavy duty and 7 yd. light weight buckets; some spare parts included; good mechanical condition. Location Melbourne, Australia. Box 3682

Bucyrus-Erie Model 5-W Diesel dragline, 100' boom, 25' insert extension. Fairbanks-Morse main engine, auxiliary 100 HP Cummins for swing generator, includes two (2) Esco buckets, one five yard and one six yard. Owner using machine and can be inspected in actual operation, very good operating condition, located in Northern Illinois. Price including buckets and approximately $5000 worth of spares. $60,000 as is. Box 3716

2-W Monighan Walking-Type Dragline #492, 85' boom, 2-year old D-13000 Caterpillar diesel engine #4S685, 2-yard Hendrix bucket, 2½ yard Page bucket, some spare parts, fair operating condition. Box 3708

Model 7-W Bucyrus-Erie dragline; machine is equipped with 180' boom, powered with a Cooper-Bessemer GS-6 diesel engine; located in western New York. For price and other details contact Tecon Corp., 2nd Floor Davis Bldg., Dallas, Texas, Mr. E. R. Funk.

2—200-W Bucyrus-Erie Draglines
1—620 Page Dragline
2—1201 Lima Shovel & Dragline
1—120-B Dragline Boom
1—44-B Bucyrus-Erie Comb. Shovel-Drag.
1—Koehring 1½ Yd. Elec. Tunnel Shovel
4—36 TD Euclid End Dumps

J. A. TERTELING & SONS, INC.
Box 1428 Ph: 3-5401 Boise, Idaho

Bucyrus-Erie 120-B dragline, 100' boom with gantry mast, 4' tracks, A-1 condition, located northern California.

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SMALL SHOVELS, CRANES, DRAGLINES—UP TO 2½ YDS.

Bucyrus-Erie 15-B dragline excavator with 30' boom, Cat diesel engine with electric starter, Unit 76 tractor type crawler mounting with 20" wide grousers, Unit 79c counterweight, machine serial #115288. Machine has been used 650 hours.
Price f.o.b. Greensboro, N. C. $18,500
Northwest 25 shovel front with ¾-yd. dipper.
Price f.o.b. Greensboro, N. C. .....$ 1,500
Northwest 25 combination dragline, clamshell shovel with Murphy diesel engine, serial #14716.
Price f.o.b. Greensboro, N. C. $14,000
Northwest 25 dragline with 40' boom (one 5' insert), 3-71 GM engine, ¾-yd. TS Hendrix bucket and 28" flat bottom shoes.
Price f.o.b. Greensboro, N. C. .....$ 8,000
Unit model 1020 dragline w/gasoline Chrysler engine, long wide crawler frame, 30" shoes, ¾-yd. Hendrix bucket and 40' boom.
Price f.o.b. Greensboro, N. C. .....$ 7,500

E. F. CRAVEN COMPANY
Greensboro, N. C.

SMALL SHOVELS, CRANES, DRAGLINES — UP to 2½ YDS.

LORAIN
MOTO-CRANE Mod. 414

40' boom, Rudomatic Tagline, outriggers, screw jacks. Mtd. on factory carrier. 1950 machine —has had excellent care.

$18,000.00

Subj. to inspect. & prior sale.
Call CYpress 2-4800

H. O. PENN MACHINERY CO. INC.
140th Street & E. River N. Y. 54, N. Y.

L80J Lorain 1¼-yd. shovel, powered by D-13000 Caterpillar engine; shovel serial #23116; new June 1952; operating condition excellent; a few spare parts included. $25,000 f.o.b. Gilbertsville, Ky. (approximate replace price $60,000). Can ship I.C. Railroad or water transportation.

BRANDEIS MACHINERY & SUPPLY CORPORATION
L. L. Freeman
P. O. Box 27 Evansville, Ind. HArrison 3-4401

Bucyrus-Erie 22-B, ¾-yd. dragline, serial #44602 (1946), with GM 4-71 diesel engine; can be inspected at our Casper, Wyoming Office.
Bucyrus-Erie 22-B, ¾-yd. dragline, serial #55092 (1947), with Cummins diesel engine; can be inspected at our Casper, Wyoming Office.
Bucyrus-Erie 22-B, ¾-yd. dragline serial #80492 (1950), with Cat D315 diesel engine; being reconditioned in our Denver plant.
Euclid scrapers — 2 77FDT 12-yd., three-axle scrapers with GM 6-71 diesel engines. One a new demonstrator, other used only 5 months. Both are in Denver and ready to go.
Caterpillar scrapers—3 DW-20, 15-yd., three-axle scrapers with sideboards. D-337 diesel engines being reconditioned in our Denver plant.

THE COLORADO BUILDERS' SUPPLY CO.
1534 Blake Street WEst 5-3571
Denver, Colorado

LIMA model 802, 2-yd. shovel, with 36" pads, air controls, powered by a Cat D17000 diesel engine, with electric starter.
Reconditioned, tops $32,500
P & H model 655 crane, 1½-cu. yd., long frame, wide pads, 90' boom, air controls, independent boom hoist. Cat 13000 engine. New 1952, excellent condition. Priced for quick sale.
LIMA paymaster truck crane, Type E34, ¾-yd., 35' boom, powered by 6-cylinder Buda gas engine; mounted on Brockway 6x6 truck carrier with ten 12:00 x 24 tires.
Reconditioned $13,000
BUCYRUS-ERIE model 15-B backhoe, ½-yd., powered by a Waukesha model HP526 gasoline engine with electric starter.
Subject to inspection $7,000

Subject to inspection & prior sale

H. O. PENN MACHINERY CO. INC.
140th St. & E. River CYpress 2-4800
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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

FOR SALE

DRAGLINES AND CRANES

2400 Lima Dragline, 130', 5-yd.
1201 Lima Dragline, 85', 3-yd.
955 P&H Dragline, 90', 2½-yd.
54-B Bucyrus-Erie Drag, 85', 2½-yd.
3500 Manitowoc Drag, 85', 2½-yd.
903 Osgood Dragline, 70', 2-yd.
802 and 604 Lima Cranes
3000-B & 3500 Manitowoc Cranes

SHOVELS AND COMBINATIONS

1055 P&H 3½-yd. Standard Shovel
1201 Lima 3½-yd. Standard Shovel
1201 Lima Combination Shovel-Crane
955 P&H 2½-yd. Standard Shovel
80-D Northwest 2½-yd. Shovel
802 Lima Comb. H.L. Shovel-Drag
51-B Bucyrus-Erie 2-yd. Shovel
44 Lima 1-yd. Backhoe
25 Northwest Combination Shovel-Drag Unit 1020 ¾-yd. Shovel
34 Lima ¾-yd. Shovel

TRUCK CRANES, EUCLIDS, DRILLS, Etc.

255 P&H Truck Cranes
MC-425 Lorain Truck Cranes
22-B Bucyrus-Erie Truck Cranes
LC-90 Link-Belt Speeder T.C.
MC-414 Lorain Truck Crane
Euclid Trucks: 27FD, 86FD, 2FD, 82FD, 36FD, 8TD, 63TD, 59TD, 60TD, 4-FFD
600 Reich Heavy Truck-Mounted Rotary Air Drills
58-BH Joy Champion Rotary Air Drills
42-T, 29-T and 27-T Well Drills
Davey Rotary Truck Air Drills
Mayhew Rotary Truck Air Drill
Garwood, LeTourneau, Caterpillar, Euclid and Bucyrus-Erie Scrapers
Caterpillar & Allis-Chalmers Dozers, Front End Loaders, Graders
International Bulldozers
Shovel, Drag, Crane & Backhoe Attach., Drag & Dipper Buckets for most makes and models.

FRANK SWABB
EQUIPMENT CO., INC.
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Marion crane and dragline combination, Model 40 A, Serial 7118, 48 ton lifting capacity, 85' boom, completely rebuilt this spring, machine now in operation.

McCALMAN CONSTRUCTION CO.
Danville Illinois

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

2-Yd. MODEL 820 LORAIN CRAWLER CRANE equipped with 100' boom, Cat diesel engine. Entire machine in very good working condition and is available immediately; located in Milwaukee.

2-Yd. MODEL 820 LORAIN CRAWLER CRANE-SHOVEL COMBINATION; equipped with Cat D-13000 diesel engine, standard crawlers, 70' boom, fairlead, maximum counterweight, new boom and like-new shovel attachment. Good condition; located at Milwaukee; available immediately.

1½-Yd. KOEHRING MODEL 605 CRANE-HOE COMBINATION; Cat D-13000 diesel engine, 60' boom, new hoe attachment. Excellent condition. Call for location to inspect.

1¼-Yd. MODEL 33-B BUCYRUS-ERIE ERECTION CRANE with 100' boom and jib, independent boom hoist, gas power. Very good condition; will be available late in June. Priced right for a big machine.

1-Yd. MODEL LS-90 LINK-BELT SHOVEL, Waukesha gas power; entire unit in like-new condition. Priced at about half of new replacement cost.

¾-Yd. MODEL 25 NORTHWEST CRANE-SHOVEL COMBINATION, equipped with Cat. D-4600 diesel engine, 45' boom, tagline reel, fairlead. Excellent condition. Located at our Milwaukee yard.

½-Yd. UNIT CRAWLER-MOUNTED DRAG-SHOVEL, equipped with Chrysler Industrial gas engine. Fair condition and priced to sell. See at our yard.

H-2 HYDROCRANE in good working condition. 22-B, shovel attachment included, ¾-yd. dipper, in good condition: $1500, f.o.b. our yard, Milwaukee, Wis.

J. P. WAITE CONSTRUCTION CO.
3308 West Pierce St. Milwaukee 15, Wis.
Phone: EVergreen 4-1900

Koehring 304, ¼-yd. dragline and hoe (1953), wide long tracks, Cat diesel engine, good condition. Box 3723

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

One Bucyrus-Erie Model 41-B, 3 motor AC electric shovel, serial no. 10796, 1½-yd. dipper, cat-mounted, 26" treads; 22'6" boom, 15' handle; good operating condition. Many replacement parts for swing and crowd machinery recently installed or available. Located Mid-West.

One Bucyrus-Erie Model 52-B, Ward-Leonard electric shovel, serial no. 11395, equipped for 3 phase, 60 cycle, 440 volt operation; 2¼ cubic yard dipper, 30' boom, 18' handle; equipped with power boom hoist and electric light plant. Well maintained and in good operating condition. Caterpillar units recently overhauled. Located Mid-West. Box 3710

Northwest Model 95, serial #14294-11394C; Model 21 Murphy diesel, serial #15593; 80' boom crane/dragline revolving fairlead; folding gantry; 2-yd. capacity; holding line—⅞" x 190'; closing line—⅞" x 215'; tag line—⅝" x 100'; 38" wide tracks.

Northwest Model 95, serial #14405-11692C; Model 21 Murphy diesel, serial #MD10772; 80' boom crane/dragline; folding gantry; 2-yd. capacity; holding line—⅞" x 190'; closing line—⅞" x 215'; tag line—⅝" x 100'; 38" wide tracks. Box 3722

EQUIPMENT WANTED

5-Yard Electric Shovel—must be in perfect working condition and not too old.

New York Trap Rock Corporation
230 Park Avenue New York 17, New York

MISCELLANEOUS EQUIPMENT

FORD MODEL JD-1025 GASOLINE ENGINE with radiator-flywheel, ring gear and starter. $200.

***ALL PRICES—**
F.O.B. SOUTH MILWAUKEE, WISCONSIN
BUCYRUS-ERIE COMPANY
South Milwaukee, Wis.

Trench hoe—Shovel Front for Osgood 200. Practically new .....$500 each
Pile driving leads, hammer, etc. $400
1947 GMC, 623 Tractor and Jahn 20-ton drop center lowboy, rough but serviceable. Price $1,000

KIRKPATRICK CONSTRUCTION CORP.
P. O. Box 380 Hopkinsville, Kentucky

New 18" dredging pump, rectangular cross section casing, high alloy steel liners, high alloy cast steel 4 van runner; spare liners Box 3696

ONE—2¼-YD. COAL LOADING DIPPER, NEW FOR 38-B. LOCATED NEAR PITTSBURGH. $2500.
BOX 3720

Model 27-T blast hole drill, serial No. 19628, Waukesha gasoline power, crawler-mounted, 33' one-piece all-steel derrick complete with tools in good working order. Located in Missouri. Priced to sell. Box 3719

One 2½-yd. Esco shovel dipper #629 for Bucyrus 52-B machine, good condition. Price: $2000 at Rockport, Calif. Rockport Redwood Co.

Model 27-T blast hole drill, serial No. 18269, Waukesha gasoline power, crawler-mounted, 33' one-piece all-steel derrick complete with tools in good working order. Located in Missouri. Priced to sell. Box 3718

FOR 50 YEARS...
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Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready.
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18 yd. Capacity. 4-24:00x29-24 ply tires. Powered by Cummins Diesel Engines.
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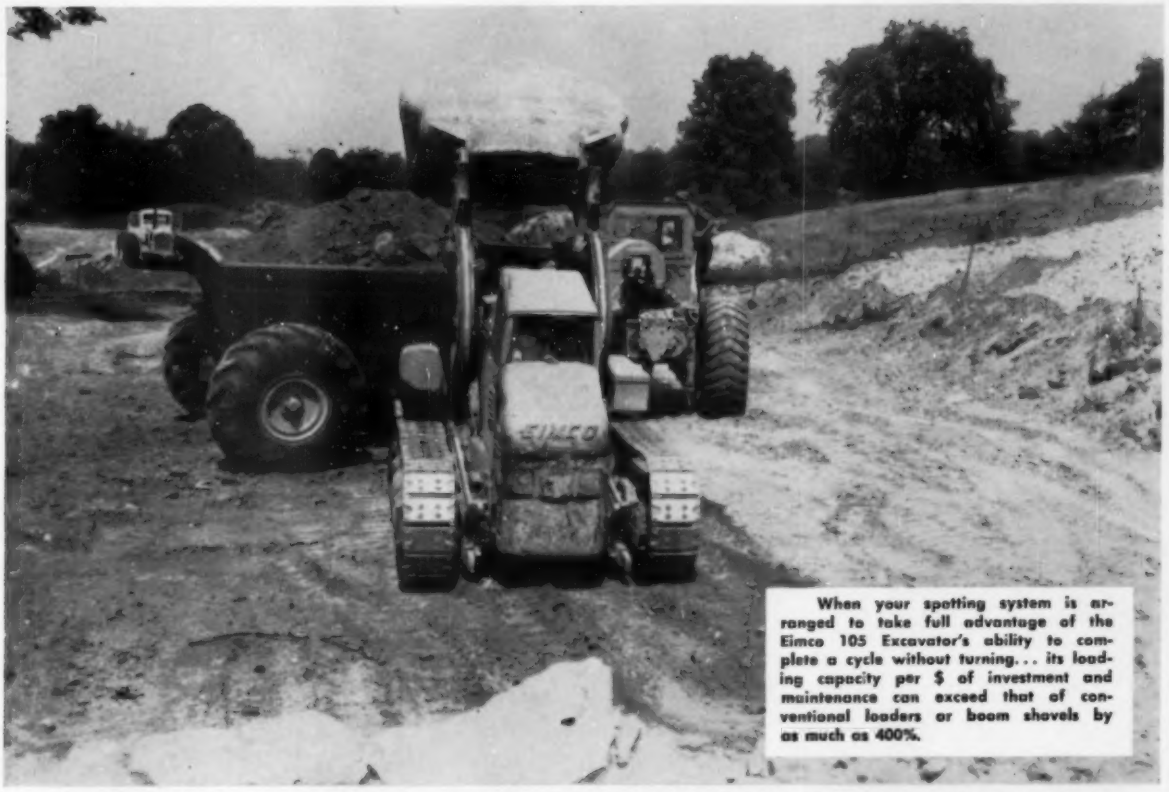
ATTACHMENTS ONLY

22-B Unused Shovel
Lima 1201 Boom 85'
22-B Crane Boom
Northwest Model 6 Boom
Northwest 80-D Backhoe
Northwest 25 Backhoe
Bay City Model 45 Shovel
Northwest 80-D Boom & Fairleads
Osgood 200 Shovel
Lorain 82 Backhoe
Bucyrus-Erie 38-B Backhoe
Lima 34-E Camelback Hoe
Lorain 50 Hoe Bucket & Arm
Unit 1020 Shovel.

AIR COMPRESSOR RENTAL CO., INC.
19615 Nottingham Rd. Cleveland 10, Ohio

POSITIONS WANTED

Coal Strip Mine Superintendent, 23 years experience as engineer and superintendent, supervisory experience on all types of shovels (¾ to 45-cu. yds.) draglines (¾ to 25-cu. yds.), will furnish references. Write 123 Roosevelt Rd., Clarksburg, W. Va., or Phone Main 2-8614.



When your spotting system is arranged to take full advantage of the Eimco 105 Excavator's ability to complete a cycle without turning... its loading capacity per $ of investment and maintenance can exceed that of conventional loaders or boom shovels by as much as 400%.

EIMCO 105 TRACTOR MOBILITY GETS *EXTRA* CAPACITY

Power shifting... operating simplicity... independent track reversal.. forward operating position... low center of gravity... are five important reasons why the Eimco 105 Tractor gets "extra" performance from its overhead or front-end loaders.

EIMCO 105 FRONT-END LOADER
2½ yard... 40,000 lb. break-out

EIMCO 105 EXCAVATOR
1½ yard... Overhead discharge

Eimco Unidrive, power-shift transmission combined with torque converter fluid drive, saves seconds every cycle and eliminates downtime due to burned facings or other clutch troubles. Without taking your left hand from the wheel, you simply manipulate power-shift levers for high, low, forward, reverse while the tractor is moving under full load. There's no reaching, no gear clash, no hesitation.

Independent track reversal is especially advantageous in front-end loading. It permits this 105 to pivot sharply from the muck pile and get material into trucks faster. It gets either loader out of trouble quickly... a big factor on hazardous jobs.

A 105 operator is always "on top of his work". Without standing or "craning" his neck, he can see to attack the muck pile at the best spot for fast loading. This, combined with operating ease, greatly reduces fatigue... gets greater man-hour efficiency.

Low center of gravity gives the 105 tractor extra stability... permits it to traverse 100% grades without tipping.

This combination of extreme tractor mobility and one of two high utility loaders, gives you a wide choice in adapting an earth-moving technique most profitable for your job requirements.

An Eimco Sales Engineer will help you decide which model fits into your job scheme most profitably.

THE EIMCO CORPORATION

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B 276

Strong candidate for
"MOST USEFUL MACHINE"

John L. Bellinger, President of K.E.B. Constr. Co., Inc., North Syracuse, N. Y., sizes up the CAT* D4 Tractor-No. 40 Scraper Unit as follows:

"This is one of the most useful pieces of machinery we own, for we can do so many jobs with it. We clear land, build roads, carry fill and dig cellars, all with this one unit. It has proven its value in our work."

The job pictured here is on a residential housing development near DeWitt, N. Y. The sturdy D4 Tractor has plenty of power to self-load the scraper in clay and hardpan, averaging a heaped 4.5 cu. yd. per load. For land clearing and rough grading the scraper is quickly detached and the No. 4A Bulldozer takes over.

The D4 fills an important place in practically any spread. It's a handy size, small enough to be moved easily from job to job; big enough to give you real production. Teamed up with the No. 40 Scraper on short hauls, its performance often rivals that of larger machines.

The Caterpillar Engine delivers 50 drawbar HP and gives the tractor 10,700 lb. maximum drawbar pull. It's economical on fuel, using No. 2 furnace oil without fouling. The optional oil clutch adds easy shifting, long life and simplified maintenance.

Designed to match the D4 for top efficiency, the No. 40 Scraper loads fast, has quick, positive ejection and is ruggedly built to stay on the job. Your Caterpillar Dealer can show you how these units can make money for you. Ask him for a demonstration on your own job. He backs the long productive life of the machines he sells with reliable service and Caterpillar parts.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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WANTED—
THE HARD WORK